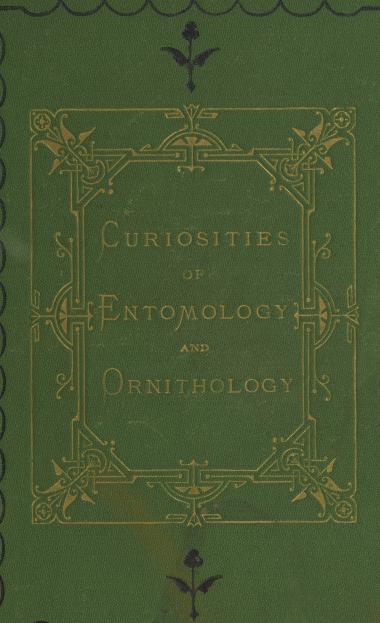
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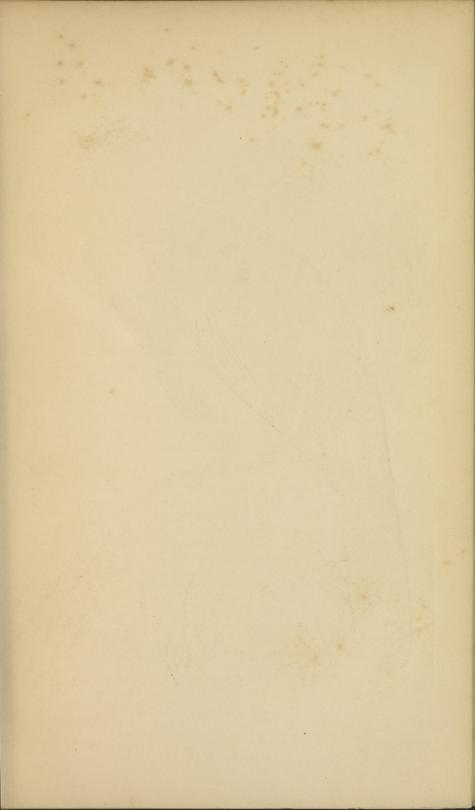
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CORYTHAIX LEUCOLOPHA.

CURIOSITIES

OF

ORNITHOLOGY.

With beautifully-coloured Mustrations,

FROM DRAWINGS BY

T. W. WOOD,

LONDON:
GROOMBRIDGE AND SONS,
5, PATERNOSTER ROW.

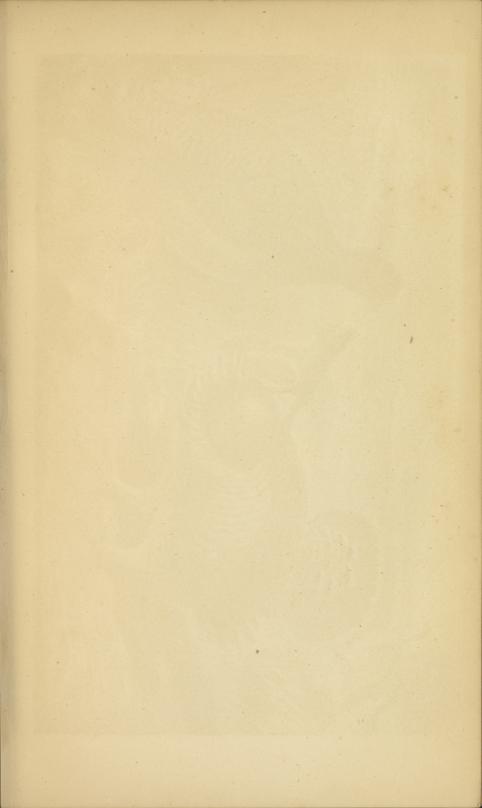
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PRAIRIE CROUSE, -TETRAO CIIPIDO.

CURIOSITIES OF ORNITHOLOGY.

THE PINNATED GROUSE.

(Tetrao Cupido.)

This curious and beautifully-feathered bird, well known in its native land as the Heath Hen, is a good example of certain species of American grouse, the males of which are furnished with large pouches or wind-bags, placed at each side of the neck. These pouches, when inflated, are about the size of a large orange, and like it in colour, with the exception of being slightly darker and tinged with brown, the elongated part towards the head being of a carmine colour. Over each eye are beautiful yellow combs, with serrated edges, which seem to sprout, as it were, from amongst the feathers when the neck-plumes are raised as the bird inflates his pouches. These plumes hang down and cover the naked pouches when they are not inflated, as in the figure of the male bird, "showing" or displaying in the distance, in the coloured plate.

These curious pouches or air-bags, however, are not exclusively possessed by birds of the grouse tribe, the common Bustard (Otis tarda), formerly found wild in this country, and the large Australian Bustard (O. Australasianus), being furnished with them, and presenting very singular aspects during their display.

When the male pays his addresses to the female, he

commences his eccentric performances by erecting his long wing-like neck-plumes till they meet over the top of his head; he also erects and expands his tail, showing the white under-coverts, and, with drooping wings, trots or toddles along, for the movement is not like walking, slightly turning in his course, and accompanying his steps with a knocking noise, which is not loud, and somewhat resembles the sound made by water escaping from an inverted bottle. After strutting a short distance in this manner, he stands still and utters his own peculiar crow, in doing which he does not raise his head or open his bill, but suddenly inflates his neck-pouches, and gives vent to his feelings in three rather loud windy hootings, of which the first note is the highest, and the second the lowest. If he hears a rival he utters a loud quawk, expressive of the highest excitement, and repeats his curious performances with greater energy.

In birds, "to the innate energies implanted for useful and necessary ends," says the Rev. E. S. Dixon, "we find superadded a further quality—beauty. To the Deity alone do works of supererogation belong: He gives what is needful with a paternal liberality, and then is lavish of his bounty, and bestows ornament and decoration upon his creatures. There can scarcely be a doubt that many of the appendages to the plumage of birds, not to say a word about brilliant colours, are given not for any use, or to serve the performance of any function in the economy of the creatures, but solely for appearance sake, a fact of which they themselves manifest a consciousness. Innumerable instances of this might be adduced, but a less well-known example is seen in the brilliant assemblage of humming-birds collected by Mr. Gould. One, perhaps several, species, in addition to the parts which usually reflect the most dazzling and glancing hues, has the very under tail-coverts metallic. In most birds, colours so disposed would be little if at all observed; but in these humming-birds the flight is so abrupt, and the motions so sharply checked and reversed, very much by the action of the tail, that the metallic feathers

are suddenly seen, like a momentary star, which as suddenly vanishes, and which marks, by its appearance and extinction, the sparkling turns in the zig-zag course which the flashing bird pursues through the sunshine. And the pigeons, too, have their amethystine necks, and their metallic plumage, either whole or partial; sometimes a complete panoply of blazing scales, occasionally a few patches of bronze and tinsel on the wings. Crests, too, in others are added, to give grace to the head." "Creatures so highly decorated as the peacock, birds of paradise, and others belonging to different orders of animated existence," says Mr. T. W. Wood, "are always possessed of the power and disposition to display those decorations. This action of display is performed by the males, generally, though not always, in presence of the females, and undoubtedly has for its object the winning of their favours. How intently is the attention of the peacock fixed upon the peahen when he stands before her with his glorious train of ocellated feathers fully expanded! Still this bird will often spread out his plumes when not blessed with a female companion. Birds are gifted with an instinct which impels them to act as if they knew what part or parts of their bodies are specially decorated, these decorations being always displayed fully, and in the best manner possible, during courtship. The peacock, as we have seen, conceals his wings, while displaying his more showy plumage; but the peacock-pheasant, or Polyplectron, displays the wings as they, with the tail, are most chastely ornamented with gem-like spots."

Dr. S. L. Mitchell, of New York, contributed to Wilson's "American Ornithology" some interesting particulars respecting these Pinnated Grouse. He observed their habits in that peculiar tract known as the Brushy Plains of Long Island (opposite to New York), which has been a favourite resort of this bird from time immemorial. They inhabit chiefly the forest range, a district from six to seven miles broad, extending between forty and fifty miles in length, from Bethphage in the Queen's County, to near the Court House, in Suffolk. This situation is so retired

that the game laws—for even republican America has game laws—are habitually disregarded, any informers being easily kept quiet by bribes, and these curious and beautiful birds are assailed on all sides almost without intermission. They have already become scarce, and if not protected in time from these lawless bird-slayers, will ere long become exterminated in that district, and if this evil example be followed in other places, the race may become extinct.

Dr. Mitchell says: "The season for pairing is in March, and the breeding-time is continued through April and May. Then the male grouse distinguishes himself by a peculiar sound. When he utters it, the parts about the throat are sensibly inflated and swelled. It may be heard on a still morning for three or four miles; some say they have perceived it as far as five or six. This noise is a sort of ventriloguism. It does not strike the ear of a bystander with much force, but impresses him with the idea, though produced within a few yards of him, of a voice a mile or two distant. This note is highly characteristic. Though very peculiar, it is termed tooting, from its resemblance to the blowing of a conch or horn from a remote quarter. The males' places of assembly are called scratching places. Men lying concealed near these places of resort, have been known to discharge several guns before either the report of the explosion, or the sight of their wounded and dead fellows would rouse them to flight."

They inhabit different and very distant districts of North America, and they are very particular in choosing their places of residence. Their favourite haunts are open, dry plains, thinly interspersed with trees, or partially overgrown with shrub-oak. They avoid ponds, marshes, and watery places, to which they seem to have a great aversion, and never drink from them. A hen in confinement was observed even to avoid that part of her cage in which the water was placed, but she picked it eagerly, drop by drop, when it was allowed to trickle down from the bars.

"The three notes," says Wilson, "are of the same tone, resembling those produced by the night-hawks in their

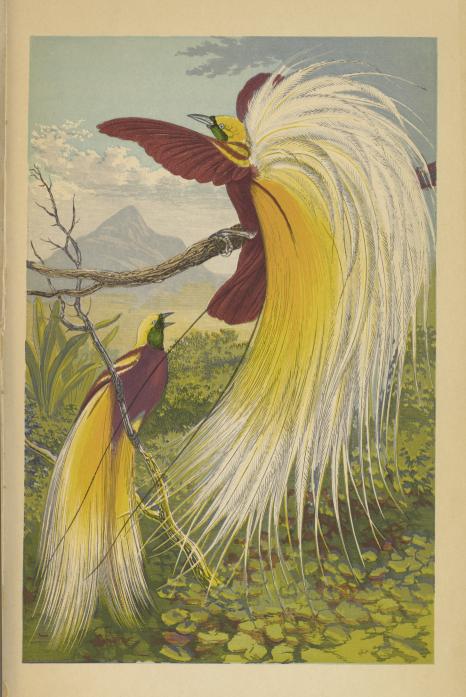
rapid descent; each strongly accented, the last being twice as long as the others. When several are thus engaged, the ear is unable to distinguish the regularity of these triple notes, there being at such times one continued humming, which is disagreeable and perplexing, from the impossibility of ascertaining from what distance, or even quarter, it proceeds. While uttering this, the bird exhibits all the ostentatious gesticulations of a turkey cock-erecting and fluttering his neck-wings, wheeling and passing before the female, and close before his fellows, as in defiance. Now and then are heard some rapid cackling notes, not unlike that of a person tickled to excessive laughter; and, in short, one can scarcely listen to them without feeling disposed to laugh from sympathy. These are uttered by the males while engaged in fight, on which occasion they leap up against each other, exactly in the manner of turkeys, seemingly with more malice than effect. This humming continues from a little before daybreak to eight or nine o'clock in the morning, when the parties separate to seek for food."

BIRDS OF PARADISE.

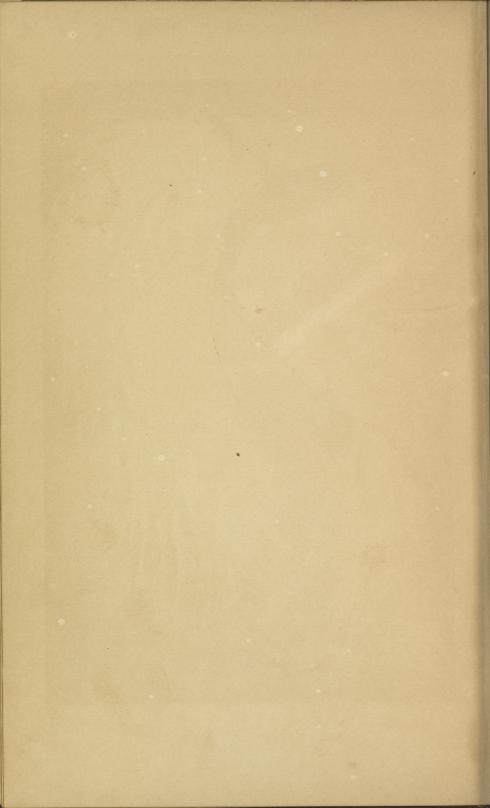
(Paradisea Papuana.)

THESE exquisitely beautiful creatures, which long attracted attention among the stuffed specimens in our museums, may now be seen, thanks to the energy and enthusiasm of modern ornithologists, in their living beauty, in the Zoological Society's Gardens. Their habits in the aviary very strongly resemble those of the jay or jackdaw, from their restless and prying disposition, and they often cling to the perpendicular parts of their cage, wherever there is a hold for their feet, and even hang suspended under a branch like a titmouse. They move on the ground by hopping. Their call consists of a series of loud but pleasingly varied notes, which are differently arranged at different times; but two or three distinct series are more frequently repeated than the others. Mr. Alfred R. Wallace says that their note is very different from that of the birds in their wild state, the latter terminating their series with a single low note, whereas these often finish with a kind of gobble repeated twice. One of their notes uttered occasionally is exceedingly like the caw of a rook or jackdaw, but less harsh; another resembles the word "jacob."

These birds display their long plumes generally in the forenoon, after a bath, and when their toilet is thoroughly completed. The body then assumes an almost erect position, the feet clinging very tightly to the perch, for otherwise the bird would fall backwards; the wings are raised, fully extended and widely separated from the body; and the bird is seen to shake the whole body, at the same time



Paradisea Papuana.



expanding the lovely ornamental feathers, the uppermost and shortest of which are elevated the most, their ends hanging over in a graceful manner. At each side of the plume the brilliant shining orange colour is seen extending to more than half its length, and gradually fading all round into the pure white, in a most exquisite manner, a strip of the richest red-brown, almost black in its depth of colour, running through the orange colour to about one quarter the length of the plume. During this display, the wings make a slight flapping movement, and the tail with its two long bare shafts, are thrust forwards under the perch. While the birds are thus showing themselves to the greatest advantage, they suddenly commence jumping and turning themselves about on the perch in a very excited manner, uttering at the same moment a series of screams, louder and more piercing than any of their ordinary notes. A careful observer may notice that the pupil of the eye is continually contracting and dilating. The iris is of a pale greenishyellow colour; the bill of a light greyish-blue, and has an opaque appearance; and the feet lead colour. Of course, none of these colours are seen in the preserved skin, but the colours of the feathers may be retained in all their intensity, by keeping the light from them as much as possible.

There are several other species belonging to this group of birds, almost each one possessing some peculiarity, quite unique in its ornamentation. The Semeioptera Wallacii, named after the intrepid traveller, and discovered by him in the Island of Batchian, one of the Moluccas, has two long, thin, whitish feathers growing from amongst the lesser wing coverts; and the natives spoke of another and finer black species with longer plumes, but after many inquiries and much fruitless exertion, he was obliged to leave without seeing a specimen.

The most splendid of the species, however, is the Great Bird of Paradise (*Paradisea apoda*), but so far from being, as was once generally supposed, a very rare bird, it is a common species plentiful throughout Aru, and Mr. Wallace says no one can traverse its forests without hearing a loud, harsh, and oft-repeated cry, "wawk, wawk, wok, wok, wok," which forms its morning and evening song, and is also frequently repeated during the day. But the young and immature birds, however, are the most frequently seen. The full-grown males live in the loftier trees, constantly flying from branch to branch, and from tree to tree, but keeping a wary eye on all intruders, and being so tenacious of life as not to fall an easy prey to the gun of the sportsman or naturalist. Indeed it is not easy to obtain sight of one. Before sunrise this beautiful bird is on the wing, seeking his food, but unlike many fruit-eating birds, he has a moderate appetite, and continues active throughout the day, instead of gorging, like many, until repletion produces torpor, and compels repose. This mode of life gives great strength to the legs and wings, and indeed to the whole frame; but the flesh is dry, tasteless, and very tough. The natives procure this bird by building a small inartificial-looking hut in the tree they frequent, during the birds' absence, and concealing themselves in the hut until a sufficient number have returned, when they shoot them with arrows.

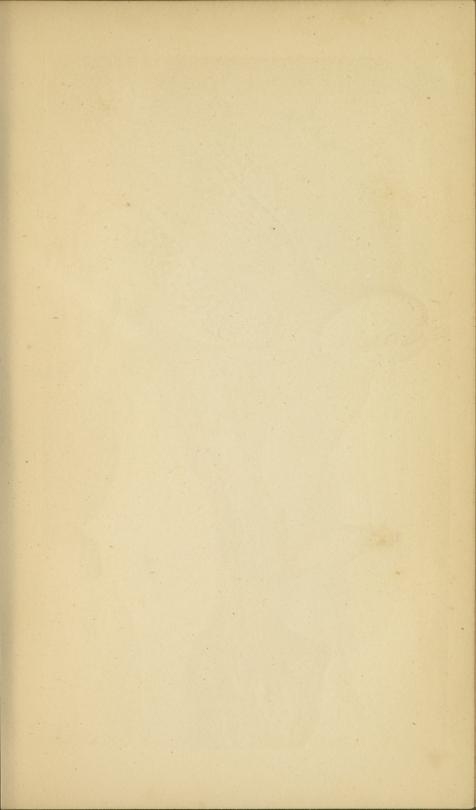
"About April, when the change from the west to the east monsoon occurs," says Mr. Wallace ("Annals of Natural History," 1857), "the Paradiseas begin to show the ornamental side-feathers, and in May and June they have mostly arrived at their full perfection. This is probably the season of pairing. They are in a state of excitement and incessant activity, and the males assemble together to exercise, dress, and display their magnificent plumage. For this purpose they prefer certain lofty, large-leaved forest trees (which at this time have no fruit), and on these, early in the morning, from ten to twenty full-plumaged birds assemble, as the natives express it, 'to play and dance.' They open their wings, stretch out their necks, shake their bodies, and keep the long golden plumes opened and vibrating, constantly changing their positions, flying across and across each other from branch to branch, and appearing proud of their activity and beauty. The long, downy, golden feathers are, however, displayed in a manner which has, I believe, been

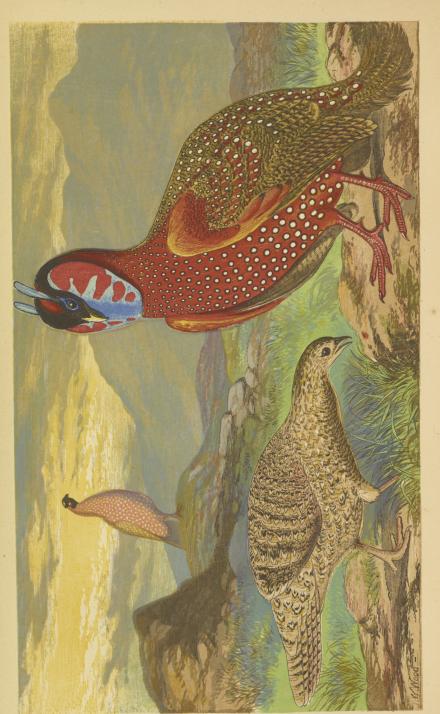
hitherto quite unknown, but in which alone the bird can be seen to full advantage, and claim our admiration as the most beautiful of all the beautiful winged forms which adorn the earth. Instead of hanging down on each side of the bird, and being almost confounded with the tail (as I believe always hitherto represented, and as they are, in fact, carried during repose and flight), they are erected vertically, over the back from under and behind the wing, and then opened and spread out in a fan-like mass, completely overshading the whole bird. The effect of this is inexpressibly beautiful. The long ungainly legs are no longer a deformity, as the bird crouches upon them. The dark brown body and wings form but a central support to the splendour above, from which more brilliant colours would distract our attention; while the pale yellow head, swelling throat of rich metallic green, and bright golden eve, give vivacity and life to the whole figure. Above, rise the intensely shining orange-coloured plumes, richly marked with a stripe of deep red, and opening out with the most perfect regularity into broad, waving feathers of airy down, every filament which terminates them distinct, yet waving and curving and closing upon each other with the vibratory motion the bird gives them; while the two immensely long filaments of the tail hang in graceful curves below."

Many erroneous statements have been published respecting the home and migration of the Great Bird of Paradise. The natives of Aru only obtaining them during the east monsoon, or trade wind, invented theories of their migration which are incorrect. "Its supposed migration," says Mr. Wallace, "has, by some, been extended to Banda, by others to Ceram and all the eastern islands of the Molucca group. These statements are, however, totally without foundation, the species being strictly confined to the New Guinea and the Aru Islands, and even to a limited portion of each of those countries. Aru consists of a very large central island, and some hundreds of smaller ones scattered around it at various distances, many being of large size, and covered with dense and lofty forests. The Paradisea apoda is confined to the

southern peninsula of New Guinea and the Aru Islands, while the *Paradisea Papuana* inhabits only the northern peninsula, with one or two of the islands (most probably) near its northern extremity."

"Nature," says Mr. Wallace, "seems to have taken every precaution that these, her choicest treasures, may not lose value by being too easily obtained. First we find an open, harbourless, inhospitable coast, exposed to the full swell of the Pacific Ocean; next a rugged and mountainous country, covered with dense forests, offering, in its swamps, precipices, and serrated ridges, an almost impassable barrier to the central regions; and, lastly, a race of the most savage and ruthless character in the very lowest stage of civilization. In such a country and among such a people are found these wonderful productions of nature. In those trackless wilds do they display that exquisite beauty and that marvellous development of plumage, calculated to excite admiration and astonishment among the most civilized and most intellectual races of man. A feather is itself a wonderful and beautiful thing; a bird clothed with feathers is almost necessarily a beautiful creature; how much then must we wonder at and admire the modification of simple feathers into the rigid, polished, wavy ribbons which adorn P. rubra, the mass of airy plumes in P. apoda, the tufts and wires of Seleucides alba, or the golden buds borne upon airy stems that spring from the tail of Cicinnurus regia, while gems and polished metals can alone compare with the tints that adorn the breast of P. sexsetacea and Astrapia nigra, and the immensely developed shoulder plumes of Epimachus magnus.





HORNED PHEASANTS, - MALES AND FEMALE.

THE HORNED PHEASANT.

(Ceriornis Satyra.)

This is the most beautiful of four well-known species of the Horned Tragopans. This species is found in the Eastern Himalayas, while the next most beautiful (the Ceriornis Hastingsii) inhabits the Western Himalayas. Indian sportsmen call both species indiscriminately Argus pheasants, which name, however, belongs to a totally different bird found in Malacca, but never near the Himalayas.

The greatest difficulty was experienced in obtaining and bringing living specimens of these birds to Europe. The first arrival was one male only of the Tragopan Temninkii; and upwards of twenty years after, in 1857, a female of the beautiful Ceriornis Hastingsii was brought to England by Mr. Thompson, who had been sent to India, by the Zoological Society, to receive and bring home a collection of these and other game birds that had been collected for the Society, and for Her Majesty the Queen. No others reached this country until 1863, when six males and three females of the most beautiful species, known as Ceriornis Satyra, all fine and healthy birds, were obtained and safely landed here through the zeal, ability, and persevering energy of Mr. John J. Stone, assisted by the Rev. W. Smyth and the Baboo Regrendra Mullick, who allowed neither trouble nor expense to stand in the way of attaining their object; and for the first time these magnificent birds were seen in this country in all their living glory.

The distinguishing characteristic of birds of this genus is that the males possess ornamental fleshy appendages of

divers colours on their heads. They have two horns situated about half an inch behind each eye, each horn being about one inch in length, and of a very clear and beautiful light blue colour, one of the specimens having a slight tinge of green. When the bird is not excited, these horns lie completely concealed beneath two triangular patches of red feathers, their points meeting at the hinder part of the head. It also has a large wattle, which can be displayed or concealed beneath the feathers at will. This wattle is almost exactly of the shape and size of the human tongue, thin and free at the sides and end, and the central portion capable of being inflated. The wattle and the naked skin round the eyes are of a pure ultramarine blue colour; the outer part on each side is deep red, a tint between carmine and vermilion, upon which, proceeding from the central blue, are five pointed stripes of pure light blue, their points being directed outwards and slightly downwards. One of these stripes forms an edging to the basal portion of the wattle, the end of which is also broadly edged with the same light blue, which colour extends upwards for a short distance along the margin, and unites with the two lower blue bands at their ends. The breadth of these stripes vary considerably in different specimens.

The colour of his upper parts is chiefly brown, mottled with black, with a few dashes of red, and there is a round white spot at the tip of each feather. The tail is somewhat like a roof in shape, and consists of twenty blackish feathers, which are mottled with a yellowish tint on their basal half. These and the largest of the tail coverts are remarkably plain, compared to the rest of his plumage. The largest coverts are brown, edged at the end with a lighter tint of the same, inside of which is a blackish line. These feathers are somewhat squared at their ends, which peculiarity, together with their edging, reminds one strongly of the plumage of the turkey, to which bird the horned pheasants are nearly allied. The plumage in different specimens varies much in depth of colour.

The female is at least one quarter smaller than the male,

and although quietly and soberly coloured, the markings of her plumage are exceedingly neat and beautiful. The quiet browns and other sober tints must be absolutely necessary to her very existence when sitting and rearing her young.

Both sexes crouch close to the ground when alarmed, and in this position even the male with his gorgeously-coloured head ornaments is likely to escape observation. Mr. T. W. Wood, who carefully observed these birds in captivity, says, "The male horned pheasants can only be seen to advantage in the early morning and in the evening, as they conceal themselves during the rest of the day; the females, however, are less retiring in their habits, one cr two of them being generally visible at any hour of the day; this is also the case with two young males, which have not yet assumed their adult plumage. I have no doubt that in thus concealing themselves during the bright daylight, the adult male birds, in their wild state, escape the attacks of enemies, to which they must be much more liable than their companions, on account of their attractive colours."

Mr. A. D. Bartlett, Superintendent of the Zoological Gardens, says, "It is quite impossible to convey in writing or drawing a very perfect idea of the extraordinary beauty of the living male bird during the short and almost momentary display he makes while courting the female, on account of the vibratory motion of the head and neck, which, of course, render a drawing imperfect, and it is next to impossible to describe these parts and the appearance of the bird in rapid motion. It is therefore necessary, in order to understand it fully, that it must be seen." The display takes place chiefly, if not exclusively, during the breeding season, and even then it occurs but rarely; and an observer will often have to wait an hour or two before his patience is rewarded by the magnificent display.

Mr. Wood says: "The male bird has three distinct modes of showing off (if I may be allowed the expression), the most characteristic of which I have endeavoured to portray in the coloured plate. When this attitude is assumed, the bird, after walking about rather excitedly, places him-

self in front of the female in the next cage; the body is slightly crouching upon the legs, the tail bent downwards; the head is kept violently jerking downwards, and this causes the horns and wattle immediately to appear. The wings have a flapping motion, and the bright red patch on them is fully displayed. On one occasion I heard a loud tapping noise, as if a person near were knocking the railings with a small stick; it, however, proceeded from the bird, each movement of the wing being accompanied by a tap. I could not understand how this noise could have been produced, as the wings did not touch the ground, except, perhaps, at their extreme ends, which would not be sufficiently stiff to cause such a loud noise; this sound therefore is, no doubt, vocal. The whole of the neck appears to be larger than usual during this action, and also the horns, which vibrate with every movement. This wonderful display is concluded by the bird suddenly drawing himself up to his full height, with the wings expanded and quivering, the horns erect, and the wattle fully displayed.

"The bird courts the 'ladye love' in his own cage, very much after the same manner as the common pheasant (*Phasianus colchicus*), by simply erecting all his feathers and elevating one shoulder, thereby exposing a greater surface to

view, without, however, showing his head-dress.

"The third mode of display is by simply standing boldly erect on an elevated perch, and giving the head one or two sudden shakes, when the horns and wattle appear for a few moments.

"The male horned pheasants have two or three distinct call notes: the one most frequently heard is much like the quacking of a duck; another is a loud and somewhat hoarse and plaintive cry, which is repeated at intervals of a few seconds, louder and louder each time; a third note is the 'crowing,' very different from that of the common pheasant, but accompanied by the same sudden and rapid fluttering of the wings as in that bird."

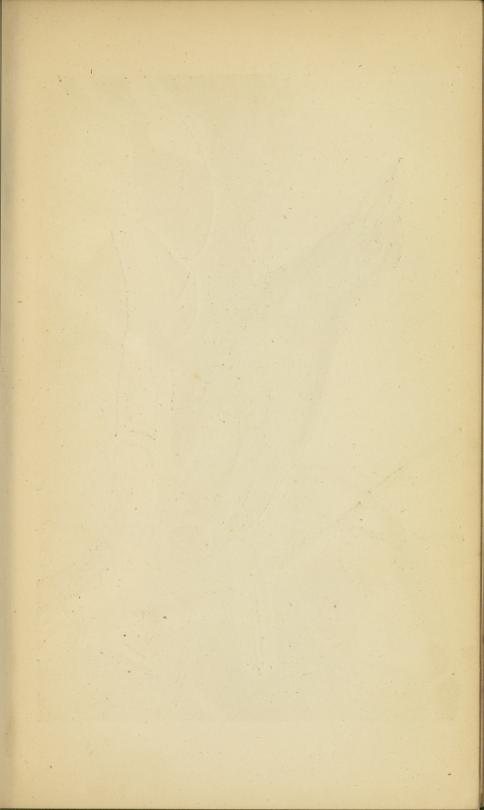
We believe that these birds are monogamous like the partridge. The eggs are very like those of the wood grouse,

and the young birds, when newly hatched, are not unlike its chicks. Their wings are sufficiently developed as soon as they are hatched to enable them to mount to the branches of trees or shrubs, and the habits of the adult birds are said to be very similar to those of the tree grouse. It is as large as the chick of the largest Cochin China fowl; its colour is rufous brown, slightly mottled on the back, and the wings are marked much like those of the female golden pheasant.

Notwithstanding their long voyage, the birds had been so well attended to, that almost as soon as they were placed in their new home they began to show signs of breeding, and in due time broods were hatched; showing that they easily adapted themselves to their new condition of life, and are capable of being naturalized. The gorgeous peacock, originally brought from the hot plains of India, is now bred and kept in perfect condition and in all its native beauty in almost every part of Europe and America. The Guinea fowl, a native of the hottest parts of Africa, lives and breeds not only as a domestic fowl wherever there is sufficient range for it to roam about during the day according to its tastes, but in the south of England, in warm, dry localities, they have been naturalized as wild birds with the greatest ease, by merely removing the eggs from the nest of a pheasant, and placing those of the Guinea fowl in their place, when the eggs have been duly hatched and the brood reared by their foster parent. "Reared in this manner," says Mr. Tegetmeier, "they become very wild and shy, partaking of all the characteristics of true fera natura. If left undisturbed, during the following season they pair, and breed with freedom, provided the locality be suitable; but wherever they have been thus introduced into this country, it has been found necessary subsequently to extirpate the entire race, as by their continued persecution they drive away the pheasants and other feathered game from the covers in which they are reared. The experiment has also been tried of introducing them into some of the more barren moors in Ireland; but, as might have been expected, the young birds were found to be so extremely impatient of cold and dampness, that it was not attended with success." But these beautiful Horned Pheasants could doubtless be easily naturalized without such objections in Scotland and the north of England, either in the same manner, or by turning the birds loose in proper localities, since they so strongly resemble the large tree grouse (Capercaillie) in its habits, for they frequent the lofty trees in the pine forests of the Himalayan mountains, are capable of bearing any amount of cold, feed on berries and tender shoots of plants, etc. Their flesh is excellent, and it is doubtless a very prolific breeder, and in all probability, if once established in the northern parts of Great Britain, would multiply rapidly, and

become as plentiful as our grouse.

It is astonishing that so few foreign animals and birds should have been naturalized in Great Britain. "Scientific Zoology," says the Rev. E. S. Dixon, "has really advanced with rapid strides; but, in spite of every effort, the practical results and available importations have unfortunately been exceedingly few. It is an undeniable reproach to Ornithology, and, it must be confessed, to Zoology in general, that those sciences, in the literature to which they have as yet given rise, have proved of little service as far as regards any suggestions respecting what we are likely to expect and obtain from comparatively untried birds and animals. Compare them with Botany and Horticulture, and it might be pronounced, in a hasty judgment, that they ought to retire abashed. From Botany and Horticulture we have in recent times derived wholesome and substantial vegetables; plentiful, grateful, and luxurious fruits; forms of delicate and fragile beauty to decorate the mansions of the wealthy patrons of the science; continual additions to our woods, our shubberies, our hothouses, our cottage gardens: nay, by the sanative force of herbs, even disease has been arrested, the irritation of incipient insanity allayed, fever mitigated-in short, life prolonged and made more comfortable during its prolongation."





BLUE-CHEEKED BARBET.

Megalaima asiatica, (Latham.

THE BLUE-CHEEKED BARBET.

(Megalaima Asiatica, of Latham.)

THE Barbets are a tolerably numerous and well-defined group of zygodactyle birds (or birds having the toes yoked, or in pairs, two before and two behind, as the parrot), inhabiting the tropics of both hemispheres, of which, we believe, no living example had ever been imported into Europe prior to the arrival of the specimen portrayed in the accompanying illustration. Ornithologists have recently succeeded in several instances in overcoming the very great difficulties experienced in the introduction into this country of living representatives of the great fruit-eating families of tropical birds. This bird, although not by any means one of the largest or finest of the Bucconidæ, as the family to which it belongs is termed, is of interest as representing a form hitherto unknown in our aviaries, and as being endowed with special modifications of structure to adapt it to a peculiar mode of life.

The Blue-cheeked Barbet was first described by the veteran ornithologist Latham, in the latter part of the last century, and provided with the not very specially appropriate name of Asiatica. He regarded it as a kind of Trogon, and as Trogons were in those days supposed to belong to America exclusively, called it the "Asiatic Trogon" (Trogon Asiaticus), which specific name, however, being the first given, we are compelled, according to the general usage of naturalists, to retain for the bird, referring it at the same time to the correct genus—Megalæma. Different ornithologists have given it other names, with an account of which we need not trouble our readers.

The native country of this species is the eastern portion of British India, where it is rather an abundant species. It is common near Calcutta, from February to May, and feeds on berries, which are always found broken in its stomach. It is a solitary bird, and, like others of the same genus, remarkable for its loud note, which, says Professor Sundevall, "may be expressed by rokurog! rokurog! the middle syllable being uttered in a higher key than the other two. Both sexes cry in the same manner, sitting still, with outstretched neck; at intervals they were seen to spring aside, or transversely across the branch, with considerable activity." Major Pearson says, "it has a peculiar habit, when perched, of bowing the head, accompanying each motion with a single note resembling the word hoo. It has two broods, one in the month of May, the other in November." The Bengalee name of this bird is Bassunt bari, or "Old Woman of the Spring," probably from the noise that it makes at this season of the year. It feeds upon wild figs, plantains, and other fruit.

Lieutenant-Colonel Tickell, a well-known Indian field naturalist, has described the nest of this bird as hemispherical, composed of dry grass, and placed externally upon a tree. But there can be no doubt that he has been misled on this point, for all the Barbets nest in holes of trees, and, like other birds that lay their eggs in similar situations, produce white eggs, and it is hardly possible that this species should prove an exception; indeed, another equally good observer, Mr. Buchanan Hamilton, states that it "excavates holes in trees for its nest." Besides the Blue-throated Barbet, eight or nine species of the same genus are found in India, and about fifteen others are known which inhabit different portions of the "Indian region," that is, Southeastern Asia and the large adjacent islands of Sumatra, Borneo, Java, and the Philippines, and we have thus altogether about twenty-six known Indian species of this family, which, in their habits and mode of life do not materially differ from the Blue-throated Barbet.

In the forests of Africa are about as many representatives

of the same family. We have no such accurate accounts of the habits and manners of these birds as of the Indian Barbets; but from the following general remarks of the wellknown African traveller and naturalist, Theodor von Heuglin, there would appear to be little difference. Of the Barbets of Eastern Africa, he says: "With the exception of the Trachyphoni, the Capitonidæ are not shy birds, though quiet and solitary, and always keeping to the high trees and bushes. The Trachyphoni are frequently seen in the plains, and although also shy, are of a much more lively and wandering nature than the Pogonorynchi and Barbatulæ. The note of the Trachyphoni is loud and very melodious; they run (though in a different way from woodpeckers) up and down the trunks of trees, feeding upon insects, berries, and fruits. as they hop from branch to branch. Their flight is short, but rapid; their course consisting of a series of numerous undulations. I never saw any of the species of this group on the ground. I am not acquainted with the mode of propagation of these birds, except that Trachyphonus margaritatus builds in holes of trees, and lays white eggs, usually from four to six in number. In the months of October and November I have often seen half-fledged young ones of this species clustering together, in the peculiar way that may be observed in some of the European genera (Parus, for instance), and sitting on the smooth side of the small branches, chirping as they await their parents. With raw flesh and hard and soft boiled eggs, I have kept some of them a long time in confinement. The Capitonidæ of Northeastern Africa are not exactly migratory, though they appear at the time when the sycamores (Ficus sycamorus) are ripe in countries where they are not generally met with."

In tropical America we find Barbets of organization and habits nearly similar to these, but neither so widely distributed, nor of so many species as in Africa and Asia. "It appears, therefore, that in the case of the Barbets," says Mr. P. L. Sclater, "we have an instance of members of the same natural family of birds being met with in the tropics of both the Old and the New World. And this is a very

noteworthy fact, for it must be recollected that, as a general rule, the avi-faunas of these two regions—that is, the general series of the birds which inhabit them respectively—are perfeetly distinct from one another. Not only are the species, if we except some few wandering forms of nearly universal distribution, invariably distinct from one another, but in nearly every case these species are referable to different genera, and, as a general rule, it may even be stated that the most characteristic birds of these two regions belong to different families. The case where members of the same natural family of birds are met with in the tropics of both hemispheres are mostly those in which the families are of extended geographical distribution. For example, the falcons (Falconidæ), owls (Strigidæ), swifts (Cypselidæ), swallows (Hirundinidæ), and thrushes (Turdidæ), are widely diffused families, which are represented in every part of the earth's surface, and are abundant in the tropics of both the Old and the New World. In the same category may be placed most of the families of waders and water-birds, which are usually of very wide range—in some few cases even the same species occurring in every part of the world. But t is quite an exceptional case for a family of birds confined to the tropics to be found in both hemispheres, and besides. the Barbets, the only well-defined families presenting the same phenomena of distribution are the parrots (Psittacidæ). and the Trogons (Trogonidæ). Members of both of these groups, as in the case of the Barbets, are found in the tropics of Africa and Asia, as well as in those of America."

Swainson gives the following interesting account of the habits of the Puff-birds, or Barbets, of Brazil: "There is something very grotesque in the appearance of all the Puff-birds, and their habits in a state of nature are no less singular. They frequent open cultivated spots near habitations, always perching on the withered branches of a low tree, where they will sit nearly motionless for hours, unless indeed they descry some luckless insect passing near them, at which they immediately dart, returning again to the identical twig they had just left, and which they will some-

times frequent for months. At such times the disproportionate size of the head is rendered more conspicuous by the bird raising its feathers so as to appear not unlike a puff-ball; hence the general name they have received from the English residents in Brazil, of which vast country all the species, I believe, are natives. When frightened, this form is suddenly changed by the feathers lying quite flat. They are very confiding, and will often take their station within a few yards of the window. The two sexes are generally near each other, and often on the same tree."

The English name of this family of birds is derived from their large conical beak, which appears to be swollen, or, as it were, puffed out at the sides of its base, being bearded with five tufts of stiff bristles directed forwards. One of these tufts is belind each nostril, one on either side of the lower mandible, and the fifth is under the symphysis.

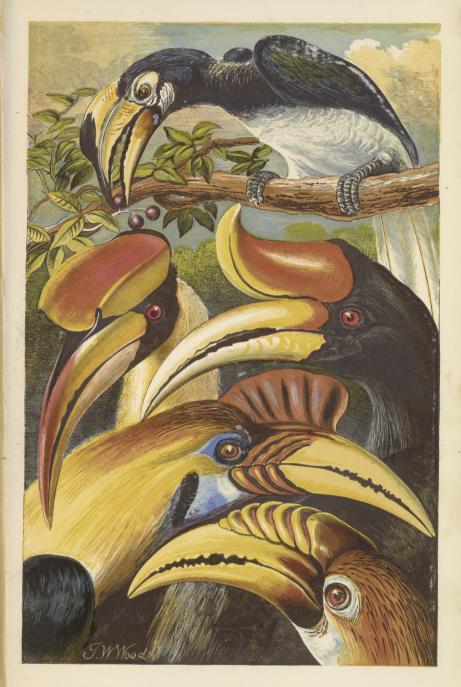
THE HORNBILLS.

(Bucerotidæ.)

THESE curious birds are seldom to be seen alive in Europe, and are even considered great curiosities by residents in the countries they inhabit. A living specimen of an adult female of the species (*Hydrocissa convexa*), from Borneo, represented in the upper figure in our plate, was obtained by the Zoological Society a few years ago.

The Hornbills are large and clumsy birds, with large and heavy bodies, rather long and powerful wings, very short legs, long neck and tail, and enormous bill, from which they take their name. They are seldom adorned with bright-coloured plumage. The ground colour of all the larger species is black, sometimes tinged with bronze, and the tail and lower parts more or less varied with white. The neck is very often of a reddish-brown colour. The plumage is generally loose, and that on the head and neck is often like hair. In some species the cheeks and part of the neck is bare, and brilliantly coloured, of which the Buceros cassidix, given in our plate, is an example. The feet are very remarkable, the three front toes being joined together for some distance from the base, so that they cannot be spread open as in most birds, but form a broad sole to the foot, indicating that the feet are used merely to rest on, and very little for walking. They resemble on a very large scale the feet of the kingfisher, which rarely or never hops, but sits still, and uses his wings when he wants to move.

The chief characteristic and most remarkable feature of



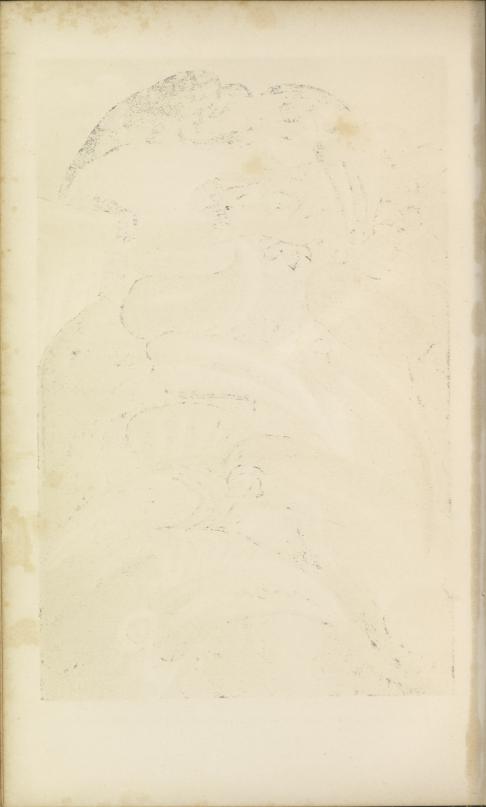
HORNBILLS.

1.—Buceros convexus.

2.—Buceros bicornis.4.—Buceros cassidix.

3.—Buceros rhinoceros.

5.--Buceros ruficollis.



the bird is the bill. Its form varies in every species, often in the sexes of the same species, and even in the same bird at different ages, but all these variations are modifications of a certain characteristic form. It is always considerably curved, rather broad and angular at the junction of the two mandibles, and compressed above and below, generally forming a sharp keel along the top. This is the shape in many of the small African and Indian species. Some have the keel raised at the base of the bill, or have ridges on the sides which meet and form rings or crests at the top; others have the keel much elevated, swollen, and projecting in a point above the bill itself; while in the larger and more remarkable species a large boss or recurved horn rises up above the crown of the head almost as large as the bill itself. Some of the African species have a sort of tube or cylinder open at the front, on the top of the bill. In those species which have ridges on the sides or top of the bill the number is supposed to indicate the age of the bird; whence all species are called "year birds" by the Dutch in the east, and after them by the Malays.

"In the great Rhinoceros Hornbill (Buceros rhinoceros of Linnæus)," says Mr. Alfred R. Wallace, "the bill attains perhaps its greatest size and beauty, the rich hues of orange crimson and ivory white with which it is adorned in the living bird being scarcely capable of imitation. It is this bird which excited the wonder of the early voyagers to Ceylon (where a variety of it exists), who believed it to have two heads—a statement which was long credited in Europe. and which may serve to teach us that the wildest and most improbable fictions of the early ages had probably a foundation in some curious natural phenomenon. The Rhinoceros Hornbill sometimes exceeds four feet in length. exertion of flying is so great that it generally rests at intervals of about a mile on some very lofty tree, whence, after a few minutes, it resumes its flight. In some of the interior villages of Sumatra and Borneo, where a gun is never heard, they will settle upon and even build in trees in the village itself; but in more populous districts, where guns

and Europeans abound, they are very shy, and take flight on seeing a man even at a considerable distance."

The tongue of the Hornbill is very small, and capable of so little motion that it may almost be considered rudimentary, and resembles much that of a kingfisher. The bill is very light for its size, though containing a tolerably compact core of porous bone to its very extremity. The horn, however, adds scarcely anything to the weight of the bill, being completely hollow, except at the base, where it has a bony core. The rest is merely an expansion of the thin horny sheath of the bill. Another remarkable peculiarity is that the upper and lower mandibles seldom meet except at the base and tip, all the middle portion gaping from an eighth to a quarter of an inch apart. The only use of this anomalous structure is supposed to be that it enables the birds to carry a considerable quantity of fruit in the closed bill, the upper and lower mandibles both being hollow, without crushing it, as they would be likely to do while flying if they were obliged to hold the fruit by the pressure of the partly-separated mandibles. This accords with the singular fact stated by the Rev. J. Mason, in his work on the "Natural Productions of Burmah," and probably communicated to him by the natives. that when the female of Buceros bicornis is sitting on its nest, the male brings her a continual supply of fruit, "but all must be unbroken, for if a fig or any other fruit is injured, she will not touch it." Corroborating this singular fact, Mr. Wallace observes that "a remarkable habit has been recorded of at least three species, which, like so many of the strange facts in nature, was for a long time considered to be fable. As soon as the female has deposited her eggs, the male imprisons her in the tree by closing up the entrance with clay and gummy substances, leaving only a small hole, out of which she puts the tip of her bill to receive the fruits, with which he keeps her well supplied. She is kept shut up in this manner, some say, till the young are hatched, others, till they are fledged. In the interior of Sumatra, in January, 1862, one of my hunters brought me a male concave Hornbill (Buceros bicornis), which he told me he had

shot when in the act of feeding its mate. On going with him to the spot I saw a hole in the trunk of a large tree, about twenty feet from the ground, out of which the bill of a Hornbill was partially protruding. With great difficulty I persuaded some natives to climb up the tree and bring me the bird, which they did, alive; and along with it a young one, apparently not many days old, and a most remarkable object. It was about the size of a half-grown duckling, but so flabby and semi-transparent as to resemble a bladder of jelly, furnished with head, legs, and rudimentary wings, but with not a sign of a feather, except a few lines of points indicating where they would come. A smaller species, inhabiting India and Ceylon (Buceros monoceros), is said by Mr. Layard to have a similar habit."

A most extraordinary habit is attributed to a species found in Java, the Buceros plicatus, which is very similar to the Buceros ruficollis of our plate, and is said by Dr. Horsfield to be called by the natives "the jealous bird," from its extreme watchfulness over its partner. They assert that if any traces appear of the nest having been visited during the absence of the male bird, he will on his return completely close up the opening with mud, and leave his unhappy wife

and children to perish.

A striking peculiarity of some of the Indian Hornbills is the remarkable difference between the male and female, which is so great that they have been described as two distinct species, and are still so mistaken by some naturalists. In birds generally the bill is a very constant organ, and its slightest modifications are often characteristic of distinct genera. The male and female may differ much in the colour of their plumage, but the bill is almost always alike. But in these Indian Hornbills the principal difference is in the bills, the plumage being the same in both, or being only different in the colours of the head and neck. The Buceros ruficollis of our plate has the neck of a rich brown in the male and entirely black in the female. In the black Malayan Hornbill (Hydrocissa Malayana) the male has a pure white bill, with a very high keel projecting forward in

an acute edge, while that of the female is jet black, with a much lower and differently-shaped keel. Mr. Wallace shot a number of these birds on the same tree, and proved this fact by dissection. In the *Buceros convexus* in our plate the male has a bill of quite a different shape and colour from that of the female, and might well be supposed to be of another species.

There is also a rare Malayan species, the Helmeted Hornbill (Buceroturus galeatus), which besides having two immense long streaming feathers in its tail, has a short, straight, pointed bill, with an immense hump on the top of it, which, instead of being hollow and light, as in all the other species, is a solid bony mass of such density that the species has received a Malay name signifying "ivory bird." The habits of this rare and curious species are unknown.

Another anomalous form consists of the African genus *Bucorvus*, which has long legs, and habitually runs on the ground, where a true eastern Hornbill never ventures. These birds are said to feed on insects, small reptiles, and also on carrion, and somewhat resemble vultures in habits and appearance.

Most of the Hornbills make their nests in hollow trees, though some of the African species are said to build rude exposed nests on lofty branches. The larger kinds lay only two eggs, the smaller ones probably a larger number, but all of a white colour. In the very young birds the bill is quite simple, without any sign of the horns, in some cases resembling that of a young kingfisher and in others that of the small Hornbills, with a simple curved bill. They are on the whole omnivorous, but the Malayan and Indian species are almost all fruit-eaters, and probably all species prefer fruit when they can get it.

Mr. Wallace says: "They are seldom to be seen in cultivated districts, inhabiting almost exclusively the primeval forests, where the smaller species are often to be met with in flocks of a dozen or twenty, while the larger ones generally go in pairs. They fly very high, far above the tops of the loftiest trees, with neck stretched out and head

pent downwards, progressing rapidly, with powerful strokes of the wings, and accompanied by a sound which can be heard at a great distance. The noise produced during flight is, in fact, so loud and peculiar, that many persons cannot believe it to be produced merely by the mechanical action of the wings on the air. It may sometimes be heard a mile off, and as one of the larger species rushes by overhead, it forcibly recalls the old legends of griffins and dragons, the awful sound of whose wings struck terror and dismay into the inhabitants of the country they came to devastate. The sound which it seems to me most nearly to resemble is, the puffing of a locomotive when starting with a heavy train. There is only one other bird that I have heard produce a sound with its wings at all resembling, though not quite equalling, that of the great Hornbills. It is the Muscovy duck (Cairina moschata) in its native country, South America. Both these birds have a very heavy body; both have, comparatively speaking, a small area of wing, and must, therefore, to support themselves, beat the air with immense force.

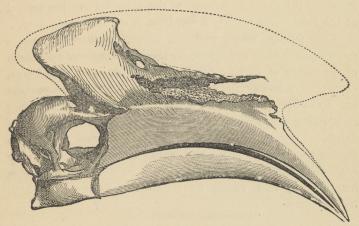
"It is interesting to watch their motions when settled upon a fruit tree. Their weight is so great that they cannot venture out on the smaller branches, nor can they cling to the twigs, or flutter among the foliage, like smaller fruiteating birds. They cannot even hop readily from branch to branch, their short legs only serving to support the massive body. On first alighting they look cautiously round till they discover some spray of fruit hanging within reach of the branch they are upon, when they move sideways towards it by a sort of shuffling hop, and then, stretching out their long neck, seize a fruit by the extreme point of the bill. To swallow it now they have got it is, however, no such easy matter; for the tongue not being adapted for deglutition, they are obliged to jerk down every mouthful by suddenly throwing back the head, and at the same time opening the bill, by which action the fruit is of course thrown down the throat. This habit has given rise to the statement that this bird, as well as the toucan, throws

its food up in the air before eating it; but a careful observation of the birds feeding in a state of nature, proves that the fruit never leaves the point of the bill except to be jerked down the throat. The action, however, so much resembles that of catching something in the mouth, that the mistake is easily accounted for. Having finished all the fruit within reach of one branch, the bird, with much deliberation, takes flight to the opposite side of the tree, where the same operation is repeated till all the fruit that can be easily reached is exhausted. This is of course soon done, and it therefore happens that Hornbills seldom visit a fruit-tree more than two or three days consecutively; whereas pigeons, barbets, bulbuls, and other fruit-eating birds, may be found on the same tree daily for as many weeks. The discovery of a dinner every day in the year must doubtless be sometimes a matter of difficulty to the larger Hornbills, and they are often obliged to resort to other kinds of food. From the gullet of the Buceros cassidix I have taken the fragments of large long-horned beetles (Batocera), and when residing in the forests of Celebes I once had an opportunity of observing from the door of my hut one of these insects captured, beaten repeatedly against the branch, and then swallowed. On another occasion I shot a Moluccan Hornbill (Buceros ruftcollis), to the roof of whose beak was sticking a large lump of bees'-comb, showing that he had been making a meal off bees'-bread and honey. They are also positively declared by the natives to eat eggs and young birds occasionally. Yet, notwithstanding this varied bill of fare, there seems little doubt but that periodical scarcity of food is the most efficient check to their increase, as shown by the fact that the larger kinds are always scarce, even where the smaller ones abound."

"The voice of these birds is very harsh and grating. It is heard occasionally while they are flying, and also when they are alarmed. When, however, a bird is wounded or captured alive, the horrible noise it makes is perhaps not to be surpassed in the animal world. It is something between

a bray and the shriek of a locomotive, and is kept up continuously, so as to be absolutely unbearable. When the female bird I have mentioned was captured on the nest we heard it about a mile off—a horrible noise even at that distance—and the screams continued without ceasing till it reached our boat. It is thought by some persons that the hollow protuberance of the bill may have something to do with the production of such a volume of sound, but besides that, there is no communication whatever between the bill and the windpipe; the very large and strongly-ringed trachea seems sufficient alone to produce it, especially when we consider the wonderful power and variety of the notes which proceed from the same organ in some of our small singing birds."

About forty-two species of Hornbills are now known, inhabiting Africa, tropical Asia, and most of the islands of the Malayan archipelago. They are quite unknown in Australia.



SKULL OF HYDROCISSA CONVEXA (MALE).

(The dotted line shows the outline of the bill.)

THE KING PENGUIN.

(Apterodytes Pennantii.)

Many attempts had been made to bring to this country specimens of the various species of the very extraordinary group of aquatic birds constituting the family Spheniscinæ, but all proved failures until 1865, when Commander William Fenwick, of H.M.S. "Harrier," succeeded in bringing to England a living specimen of the King Penguin from the neighbourhood of the Falkland Islands, a portrait of which we give in the accompanying coloured plate. But notwithstanding the great care taken of this most interesting arrival at the Zoological Society's Gardens, it unfortunately died.

This family, which includes several distinct genera, is more aquatic than any other, for they are absolutely deficient of the means of flight. On land they move slowly and with comparative awkwardness, but in the water their movements are exceedingly rapid and easy, their speed in swimming and diving surpassing even that of the greater number of fishes. They sport and seek their food safely in the sea during the heaviest gales, and spring from the water in play with such rapidity, that they cannot be distinguished from leaping-fish, and recall to mind the beautiful lines of Shelley, as—

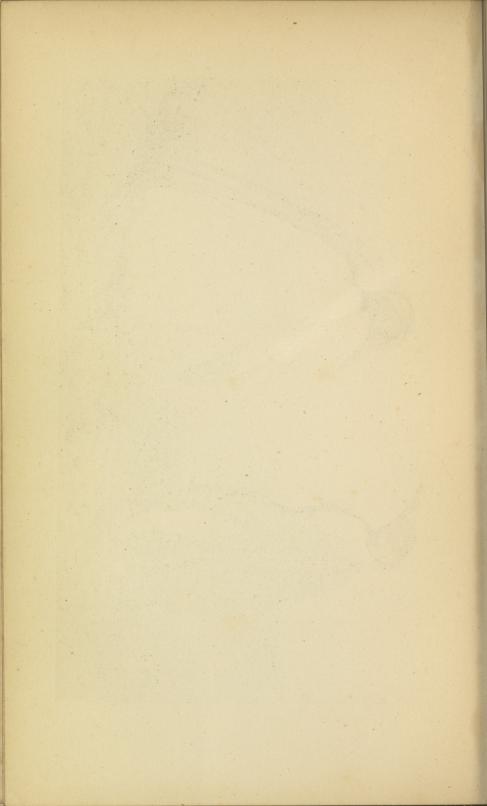
"Outspeeding the shark
And the sword-fish dark,
Under the ocean foam;
And up through the rifts
Of the rocky cliffs,
They pass to their Dorian home."

They pass to their Dorian home.

Little is known of their movements in the water, as they



HE KING PENGUIN.
Apterodytes Pennantn



do not afford much opportunity for observation; but their singular structure and movements and habits on land have attracted much attention from those naturalists who have visited high latitudes in the southern seas.

Mr. G. Bennett has described a colony of one species at Macquarie Island, in the South Pacific Ocean, which occupied thirty or forty acres, the number of birds being immense, and thousands constantly passing to and from the sea. He says: "They are arranged when on shore in as compact and in as regular ranks as a regiment of soldiers. The females hatch the eggs by keeping them between their thighs, and if approached during the time of incubation, move away. carrying the eggs with them. At this time the male goes to sea and collects food for the female, which becomes very fat. After the young is hatched, both parents go to sea and bring home food for it, and it soon becomes so fat as to be scarcely able to walk, the old birds getting very thin. They sit upright on their roosting-places, and walk in the erect position till they arrive at the beach, when they throw themselves on their breasts to encounter the heavy seas met with at the landing-place."

Like almost all birds they will courageously defend their eggs and young. The late Admiral Fitzroy, who commanded the exploring expedition in H.M.S. "Beagle," speaking of the multitude of Penguins in the thick rushy grass "tussac" of the shore of Noir Island, states that "they were very valiant in self-defence, and ran open-mouthed by dozens at any one who invaded their territory, little knowing how soon a stick would scatter them on the ground. The young were good eating, but the old were dark and tough when cooked. The manner in which they feed their young is curious and amusing. The old bird gets on a little eminence, and makes a great noise between braying and quacking, holding its head up in the air as if it were haranguing the penguinery, while the young one stands close to it, but a little lower; the old bird having continued its clatter for about a mipute, puts its head down and opens its mouth widely, into which the young one thrusts its beak, and then appears to

suck from the throat of its mother for a minute or two, after which the clatter is repeated, and the young one again feeds, and this continues for about ten minutes."

Mr. C. Darwin describes, very graphically, the behaviour of one of these animals, whose retreat to the sea was intercepted by him:-"One day, having placed myself between a Penguin (Spheniscus demersus) and the water, I was much amused at watching its habits. It was a brave bird, and, till reaching the sea, it regularly fought and drove me backwards. Nothing less than heavy blows would have stopped him, every inch gained he firmly kept, standing close before me, erect and determined. When thus opposed, he continually rolled his head from side to side in a very odd manner, as if the power of vision lay only in the interior, and basal part of the eye. This bird is commonly called the Jackass Penguin, from its habit while on shore of throwing its head backwards, and making a loud, strange noise, very like the braying of an ass. While at sea, and undisturbed, its note is very deep and solemn, and is often heard in the night-time. In diving, its little plumeless wings are used for fins. When at sea and fishing, it comes to the surface for the purpose of breathing with such a spring, and dives again so instantaneously, that I defy any at first sight to be sure that it is not a fish leaping for sport."

The various species have very different modes of making their nests and hatching their eggs. Writing of the Jackass Penguin, which breeds in the Falkland Islands, Captain C. E. Abbott says:—"Thousands visit the land in October, to burrow in the soil and deposit their two white eggs in the deep hole that they have excavated;" and he observes that at places remote from settlements the holes are comparatively shallow, while those made near to human habitations are much deeper, so as to prevent the eggs being taken. This species is described as walking upright, except when frightened and hard pressed, when it loses its balance, and falls forward, employing its wings as legs in escaping through the "tussacs," as described by Mr. C.

Darwin.

The Gentor Penguin (Eudyptes papua), forms regular penguineries—if we may coin a word—like rookeries, sometimes situated even miles from the shore, and far away from salt water. Leading to these abodes are regular paths, along which companies of twenty or thirty birds may be seen marching at a time. They do not make particular nests, but the eggs laid by each bird are placed as closely

together as the animals can stand.

The Rock-Hopper, a species common in the Falkland Islands, lays during the first week in November, on the cliffy slopes near the fresh-water streams; although, like the Gentor, it is constantly passing to and from the sea. The breeding-places sometimes extend five hundred yards in length by fifty yards in width, the eggs being placed so close together that it is impossible to walk without treading on them. Notwithstanding the large number of nests and eggs, the birds appear to be able to find, without difficulty, their own abode, after having been driven off, each walking straight back to its own nest, and placing the eggs between its legs with the utmost care, so as to bring them both in contact with a bare space in the centre of the lower part of the body, which is their mode of incubating. The male, when not away fishing, stands up beside the female.

The Cormorants are said to breed close to the Penguins, associating with them in harmony; but the Skud Gull watches for an unprotected nest, and destroys the eggs or

young during the absence of the parents.

The entire family of the Penguins is characterized by their short fin-like wings, which are covered with dense scale-like feathers, the tail being composed of rigid narrow feathers. The tarsus, or that part of the foot to which the leg is articulated, or joined, usually so long and leg-like in birds, is excessively short, the feet flat and webbed, the hind toe being very small, attached to the inner toe, and directed forwards. The family comprises many species, which are chiefly distinguished by modifications of the bill.

The outward appearance of the King Penguin is admirably depicted in the coloured plate, the erect attitude, the

manner of walking, the peculiar form of the body, and the singular fin or flapper-like character of the rudimentary wings, being all made evident by our artist; but the extraordinary internal structure of the whole family of these singular birds presents so many curious modifications, so wonderfully adapted by the Creator to their peculiar mode of life, that a brief description of them will doubtless be interesting to our readers.

The bones composing the skeleton are hard, dense, and compact. "Unlike those of aërial voyagers," says Mr. W. B. Tegetmeier, "they do not contain air, but their cavities are filled with oily marrow. The air-cells which in ordinary birds surround the different viscera, and so aid in producing the extreme buoyancy required for flight, are small and rudimentary in the Penguin. The bones of the upper extremity are peculiarly adapted to the aquatic habits of the bird. The scapula or blade-bone, narrow in all birds as compared with its size in mammals, is very straight and unusually large at its posterior or lower extremity. The whole of the bones of the fore-limb are thin and flat, so as to constitute a thin paddle that can be passed edgeways through the water, as it is brought forwards preparatory to making a propelling stroke. Two of the bones of the carpus or wrist are remarkably large. Of the metacarpal bones, or those corresponding to the palm of the hand in man, two only are developed, supporting respectively the middle and little finger. The thumb bone, which in most birds is found supporting the little winglet, is entirely wanting.

"In the feet the tarsus, or portion of the limb usually covered with scales, and generally but incorrectly termed the leg or shank, is excessively short, and is placed on the ground in walking, so that the animal moves with a plantigrade step (or step on the sole of the foot). The muscles constituting the flesh are peculiar, being excessively firm and of a dark red colour. The pectorals—those on the breast which move the wings—are singularly arranged. In the greater number of birds, the outer muscle, which pulls down the wing and causes it to strike the air in its flight, is

by far the larger, the one underneath, that serves to raise the wing, being much weaker; but in the Penguin, where the wing has to be drawn forwards through so resisting a medium as water, the muscle raising the paddle or bringing it forward is greatly developed, and extends the entire length of the sternum (breast-bone).

"The feathers are very peculiar; but little more than the mere shaft is developed, and this is so flattened, especially on the paddles, as to form a series of overlapping scales, much more closely resembling the covering of a fish than that of a bird. The feathers on the body are bent in the middle of their length, nearly at right angles, so that although the basal portion rises erect from the skin, the terminal ends overlap so as to form a close layer impervious to water. This arrangement, however, is not peculiar to the Penguins, but may be found in almost all aquatic birds, the breast feathers of the common duck furnishing a good example.

"The feathers of the tail are very peculiar, being stiff and spiny, so as to support the body, and form with the two legs the tripod on which the animal stands when in the

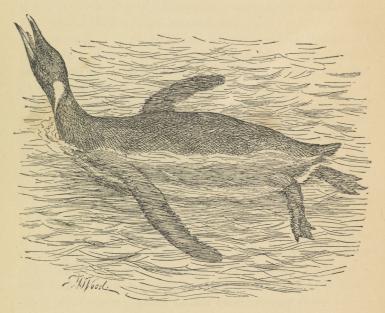
erect position.

"The bones of the tail, moreover, are strangely modified: in birds in general the last caudal vertebra is expanded into a share-shaped process, flattened from side to side. This is adapted to the support of the quill feathers used in flight. These are absent in the Penguin, consequently the last bone of the tail is unexpanded; and as another remarkable peculiarity, the absence of the oil gland, or uropygium, may be noticed. It is strange that this gland, which is generally so very large in ducks and other water-birds, should be absent in the most aquatic of all; the explanation most probably is that the scale-like plumage of the Penguin does not require oiling to prevent the entrance of water, like the softer plumage of the duck.

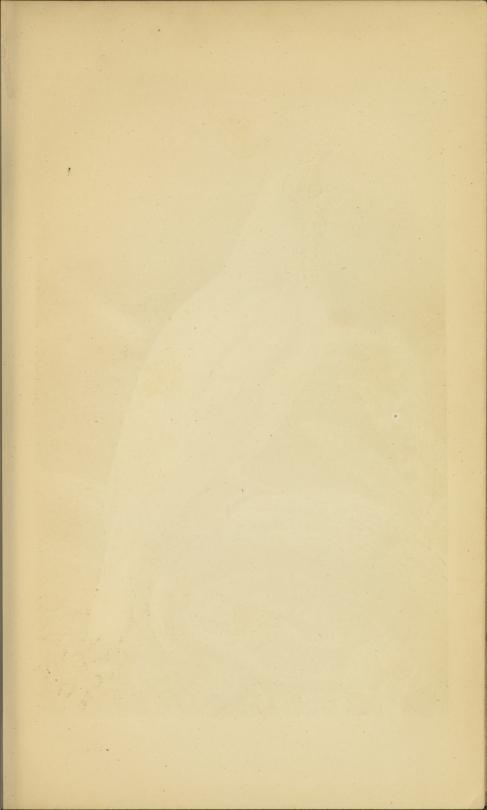
"As in all diving birds, the internal veins (venæ cavæ) of the Penguin are immense in size, and serve as reservoirs for the impure venous blood, until the return of

the animal to the surface enables it to be purified by breathing.

"In almost every other bird that exists, the pupil of the eye is circular; in the Penguin it is an elongated slit, a variation to which their singular mode of looking at an object, noticed by Mr. C. Darwin, is most likely due, and which has probably some direct reference to their subaqueous mode of life."



KING PENGUIN SWIMMING.





NAKED-THROATED COTINGA.

Chasmorhynchus nudicollis.

THE BELL-BIRDS OF AMERICA.

(Chasmorhynchi.)

A LIVING specimen, an adult male, of that extraordinary bird the Naked-throated Cotinga, or Bell-bird of Brazil (Chasmo-rhynchus nudicollis), was first obtained in May 1867, for the Zoological Society, from a well-known London dealer in living animals, for the sum of £10. Birds that, in a state of nature, live almost entirely on ripe fruit are, as might be expected, difficult creatures to provide for in a state of captivity, especially during the voyage home, and consequently rarely reach Europe alive; but a few years ago, several forms belonging to the various fruit-eating families of the tropics of both hemispheres were successfully imported.

The genus *Chasmorhynchus* embraces four species of birds, of about the same size as the missel-thrush of Europe, each inhabiting a distinct region of tropical America, but essentially different in structure.

The most special external characteristic which distinguishes the Bell-birds from other genera of the same family (Cotingidæ), is the development in the adult male of naked skin and fleshy wattles in various parts of the head and neck. In all of the known species the adult male is either wholly or partly of a pure snowy white, with more or less of these peculiar excrescences, while the female is entirely without them, and of a dull green colour above and yellowish below.

In the Naked-throated, or Brazilian Bell-bird, the adult male is wholly of a pure snowy white. The space round the eyes and throat is covered with a naked fleshy skin, which is very sparingly clothed with minute black feathers, only distinguishable on close examination. In the breeding season this naked skin becomes of a fine green colour, which disappears during the rest of the year. The female, as we have already stated, has a very different appearance, being of a dull green colour above, with a blackish head, and of a yellowish colour, flamulated with green below, and she has not any trace of the naked throat and face, which are the characteristics of the male.

The Bell-bird of Brazil, also called in Eastern Brazil the Araponga, was first made known by the French naturalist Vieillot, in 1815, from specimens in the collection of the Jardin des Plantes at Paris. But the best, and, in fact, only good description of the living bird, in a state of nature, is given by that excellent naturalist Prince Maximilian, of Neuwied, in his "Contributions to the Natural History of Brazil," published at Weimar in 1830. Prince Maximilian observes that this remarkable bird is one of the most singular features in the fauna (or list of animals peculiar to a country), of the wooded coast region of Brazil, and attracts the stranger's notice as well by its brilliant white plumage as by its clear ringing voice. It appears to be very generally distributed through the woods, haunting especially the thickest and most secluded parts of the forests. Consequently, the Prince and his party, during their expeditions in the neighbourhood of Rio de Janeiro, had often heard its peculiar notes before they obtained specimens of the bird. The Prince describes these notes as resembling the sound of a clear ringing bell, sometimes repeated at intervals, and at other times following each other in quick succession. In the latter case, they resemble the sound produced by a blacksmith striking a piece of steel upon an anvil, whence the Portuguese have named the bird Ferreiro (smith). The song is heard at all hours of the day, and when, as often happens, several of these birds are in the same part of the forest, and begin singing against and answering each other, the effect is extraordinary and singular in the extreme. It often perches on the highest withered point of a colossal forest tree, and pours forth its loud metallic notes out of the reach of gun-shot, at the same time that its lovely white plumage forms a fine contrast against the clear blue sky. It is, however, easily disturbed by the appearance of anything strange. It feeds exclusively upon fruit, as was found by dissection. Neither the Prince, nor subsequent observers, were able to gain any information as to its mode of nesting.

Mr. P. L. Sclater, the Secretary to the Zoological Society of London, states that shortly after the bird "had arrived in the Society's gardens it commenced its song, and continued to pour forth its peculiar notes at intervals of more or less frequency for several weeks;" and adds, "that the bird also makes the most extraordinary gesticulations when producing these sounds. When commencing its song it usually stands upright with its bill aloft. Subsequently it lowers its bill, and throws itself violently forward and downward, seeming to assist itself in this manner to pour forth its final notes." He further observes that it "lost the brilliant green colour of its face and throat at the conclusion of the love-season, and those parts became of a dull grey or lead-colour. Later in the summer, a second example of the same species was purchased for the Society. It was a young male, which, as is usually the case with young birds, was clad in the plumage of the female, but is now gradually assuming its adult dress."

An accurate observer says: "The first note is a loud, barsh, and somewhat grating noise; this is followed by six or eight fine, clear, metallic ringing notes, with an interval of about a second between each of them. The resemblance of these to the sound of an anvil is most extraordinary. The clear, metallic ring, repeated at about the same rate that a blacksmith strikes upon the anvil, is so perfect that many persons upon hearing it are unwilling to believe the sound could be produced by the delicate organs forming the vocal apparatus of so small a bird."

The Campanero, or Chasmorhynchus niveus, which frequents the forests of Cayenne, British Guiana, and Surinam, is of a pure white, like the Brazilian species, but there is

no deficiency of feathers on the throat, and a long straight caruncle or protuberance of flesh issues from the base of the bill, which at once distinguishes it from the preceding species. In a young male in Mr. Sclater's collection, this curious caruncle is about three and a-half inches long, but it is often longer in adults. It is scantily clothed with small feathers throughout. It is probably carried erect in the breeding season, as figured by Buffon, and, at any rate, when the bird is in song. The female has no caruncle, and much resembles the female of the Brazilian species.

The Bell-bird of Cayenne was well-known to the older writers on ornithology, but the best description of the bird and its habits is given by Mr. Waterton, in his "Wanderings," who, writing of the Cotingas of Demerara, says: "The fifth species is the celebrated Campanero of the Spaniards, called 'Dara' by the Indians, and 'Bell-bird' by the English. He is about the size of the jay. His plumage is white as snow. On his forehead rises a spiral tube, nearly three inches long. It is jet black, dotted all over with small white feathers. It has a communication with the palate, and when filled with air looks like a spire; when empty, it becomes pendulous. His note is loud and clear, like the sound of a bell, and may be heard at the distance of three miles. In the midst of these extensive wilds, generally on the dried top of an aged mora, almost out of gun-reach, you will see the Campanero. No sound or song from any of the winged inhabitants of the forest. not even the clearly-pronounced 'Whip-poor-Will' from the goat-sucker, causes such astonishment as the toll of the Campanero. With many of the feathered race he pays the common tribute of a morning and an evening song; and even when the meridian sun has shut in silence the mouths of almost the whole of animated nature, the Campanero still cheers the forest. You hear his toll, and then a pause for a minute, and then another toll, and then a pause again, and then a toll, and again a pause; then he is silent for six or eight minutes, and then another toll, and so on. Acteon would stop in the mid chase, Maria would defer her evening

song, and Orpheus himself would drop his lute to listen to him; so sweet, so novel and romantic is the toll of the pretty snow-white *Campanero*. He is never seen to feed with the other Cotingas, nor is it known in what part of Guiana he makes his nest."

The Chasmorhynchus variegatus is found in the forests bordering the northern coast of Venezuela and those of Trinidad. The adult male also has the white body-plumage of the two preceding species, but his wings are black and his head is brown, so that he cannot easily be confounded with either of the former species. His bare throat is sparingly clothed with small black feathers, as in the Brazilian species, and he also has numerous small fleshy caruncles hanging from the lower part of the throat, which excrescences attain considerable length in the adult bird. The female resembles the female of the Brazilian species.

The Three-wattled Bell-bird (Chasmorhynchus tricarunculatus) is a still more wonderful species of this extraordinary genus, and is found in Chiriqui and Costa Rica. The head, neck, and breast of the male are alone of the glossy white which is so characteristic of the genus, the whole of the hinder part of the body, including the wings and the tail, being of a deep chesnut red. Besides having the caruncle springing from the base of the bill, which distinguishes the Cayenne species, he throws out two additional elongated wattles from the angles of his mouth. These are thinner and narrower than the single horn of the Cayenne species, and attain a greater length. The medial caruncle of a young male in Mr. Sclater's collection measures nearly four and a-half inches in length, and extends, when recumbent, beyond the middle of its back. The female scarcely differs from those of the other species.

THE TOURACOES OF AFRICA.

Musophagidæ.)

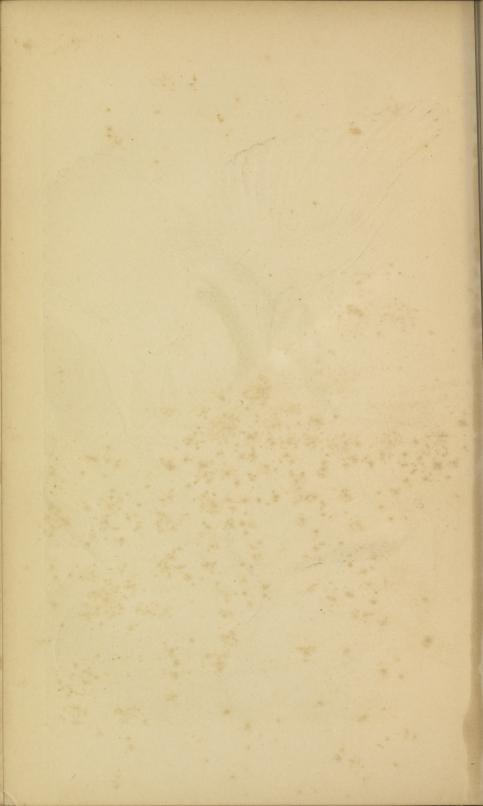
THE Violet Plantain-eater (Musophaga violacea) and the White-crested Touraco (Turacus albocristatus), depicted in the accompanying plate, possess unusual interest for the chemist as well as the ornithologist, from the discovery of a singular property in their red feathers, from which a peculiar pigment has been obtained; the feathers yielding up their colouring-matter to pure water, a beautiful rose-coloured solution being formed. Mr. Ward, of Wigmore Street, had noticed the evanescence and solubility of this red tint many years ago, and other observers within the last few years had even succeeded in staining pieces of paper with the coloured solution which they yield. Dr. Benjamin Hinde, principal Medical Officer on the Military Staff at Bathurst, on the Gambia, writing to his friend, Mr. Hugh Owen, of the Finance Department of the Great Western Railway, in May, 1865, says:-"I enclose a paper stained with the crimson from the feather of the Corythaix (the Musophaga violacea, which is much more common here); all this colour came from the inch of feather enclosed. I also send some feathers partly washed; one of them especially I have washed to a pale pink at the base, leaving the colour much darker at the tip. The moment soap touches them the colour runs, but I feel it difficult to get it out in pure water. Nevertheless, the birds I sent home washed themselves nearly white in the water left for them to drink!" In a subsequent letter, Dr. Hinde gives some details concerning the different species of Plantain-eaters, and also says with reference to



Musophaga violacea.

WHITE-CRESTED TURACU.

Turacus albocristatus.



the feathers he had previously sent to England, "All the feathers sent were from the same bird, and grew in this house!" This fact negatives any idea of an artificial dye being present in the feathers, and is further referred to in the following memoranda, by Mr. Hugh Owen:-"A pair of violet Plantain-eaters from the Gold Coast were sent over to a friend in Ireland by Dr. Hinde. The birds arrived in excellent condition, and were speedily provided with ample space and all appliances for cleanliness. For a while the splendid plumage of the strangers, the brilliant crimson patch on the deep violet, nay, almost black, of the wing excited continual admiration. After a day or two the crimson faded; in a few more the colour changed to a pale and dirty grey. The disappointed owner wrote an account of this change to Bathurst, concluding, of course, that the wily natives had imposed on Dr. Hinde by selling him a pair of painted birds. This was, however, impossible; there was no mistaking the peculiar and shield-shaped bill or the legs of the Musophaga. Whatever change had taken place, the birds were genuine Touracoes. Without delay another bird was procured, so young as only to be partly fledged, the wings only in the pin-feathers. As soon as these were sufficiently grown the experiment was tried, and the colours found to be inconstant and capable of extraction."

Mr. W. B. Tegetmeier's attention having been drawn to this singular property, he at once saw that it was worthy of fuller investigation than it had received, and named it five years ago to his friend, Professor Church, of the Royal Agricultural College, who carried out a series of experiments, which have led to some very interesting though unexpected results.

"All the colours which the feathers of birds display," says the Professor, "are due either to what we may call the 'optical' character of the surfaces of the web, or to the presence in it of definite colouring matters. These colouring matters have been as yet but very imperfectly studied. In two or three instances only have they been actually sepa-

rated from the feathers containing them, while in no case have they been accurately examined from a chemical point of view. So far as I can learn, we have no exact information as to the amount, and the chemical constitution, deportment, and reactions of those substances which M. Bogdanow, some ten years ago, succeeded in extracting from the red feathers of Calurus auriceps and Cotinga cærulea.

"The birds from which I have succeeded in extracting this colouring matter are of several species, and generally go under the designation of Plantain-eaters, the native African name for them being represented by the word Touraco. These birds are entirely African. They belong to the Order Scansores, and the Family Cuculina. The Musophagides constitute the first section of this family, and to this section belong three genera, namely, Turacus, Musophaga, and Shizorhis. From two species of Turacus and one of Musophaga I have procured the new red pigment-Turacus albocristatus, Cape; T. porphyreolophus, Natal; and Musophaga violacea, Gold Coast. The plumage of these birds does not present any great general brilliancy. The dusky tints of most of the large feathers of the tail and the smaller feathers of the wings have usually a more or less decided green or violet metallic reflexion, while the wingcoverts in some species are greenish, and of that variety of colouration which has been termed enamelled. The red pigment occurs in the primary and secondary pinion feathers, from twelve to fifteen of which have either a crimson blotch upon them, or are almost wholly coloured." Professor Church gave the name Turacine to the crimson pigment which the Turacus contains. In order to extract this pigment, the plan he finally adopted was as follows:-

"The barbs constituting the red part of the web are stripped from the shaft of the feathers, placed in a beaker, and washed with ether and then with alcohol. This treatment removes the grease and adherent dirt very effectually. When the red barbs thus washed have been dried between folds of filter paper they are placed in a cold, very dilute, solution of caustic soda—a solution containing one part of

alkali in five thousand of distilled water being quite strong enough. Ammonia, potash, or the carbonated alkalies may be used in lieu of caustic soda. The mass is stirred at intervals for fifteen minutes or thereabouts: the red solution is poured off and pure water added: by successive treatments with fresh portions of dilute alkali and pure water, the whole of the crimson pigment is obtained in solution. and the residual barbs are left white or pinky grey. All the coloured liquors having been mixed, they are poured in a slender stream with constant stirring into dilute hydrochloric acid made by mixing one part of the commercial acid with nine parts of water. When the red precipitate of the pigment thus rendered insoluble has settled, the supernatant liquid is decanted off, and the red matter thrown upon a wetted filter and washed with water. The liquid comes through quite colourless, until there is no longer any trace of acid left in the pigment on the filter. When this occurs the residue on the filter is washed with water containing a few drops of acetic acid to the pint of water, and then syringed out of the filter into an evaporating basin, and dried at a gentle heat. The dry pigment is next to be washed with a mixture of alcohol and ether, and once more dried. It is now perfectly pure and yet unchanged, so far as I have examined it.

"Prepared as before described, it occurs in scales having a deep violet purple colour by reflected light, and showing a crimson tint when seen in small fragments by transmitted light. It has not yet been obtained in a crystalline form. It is slightly soluble in pure water, giving a rose red liquid. The presence of acids and salts renders water incapable of dissolving it. It is not soluble in pure alcohol or ether. In alkaline liquids of all kinds it immediately dissolves, forming solutions which show a bluer tint than that of the original pigment. Very strong solutions of the caustic alkalies dissolve the pigment, but at the same time it suffers a partial decomposition, evidenced by an odour, resembling that of certain organic bases, which it then evolves. Fuming nitric acid dissolves it with a deep brown tint, destroying it; in oil

of vitriol it is soluble with partial alteration. Turacine seems

to have slightly acid properties.

"The close resemblance of turacine to cruorine induced me to test at once, in the ash of the new pigment, for iron, the characteristic metallic constituent of the colouring matter of the blood. The ash was dissolved in nitric acid, excess of sodic acetate added, and then potassic ferrocyanide. To my astonishment, instead of the deep blue of the ferric ferrocyanide, the rich purple brown precipitate of the cupric ferrocyanide was at once seen. Not only was copper present, but there was so much of it that it could be detected by its spectrum in a few of the red barbs of the original feathers, by burning them on a platinum wire, moistening them with strong hydrochloric acid, and then placing the ash in the flame of a Bunsen burner. This detection of copper in the colouring matter was so extraordinary, that I determined to sift the matter thoroughly. My first thought was that a preservative solution containing cupric sulphate had been employed in dressing the skin of the birds; but I soon found this notion untenable, for there is no copper in any part of the bird save in the red feathers, and in these feathers themselves the presence of copper is strictly confined to the red barbs. Even barbs that are partly red and partly black contain no copper in their black parts, and abundance in those which are red. Moreover, as acids do not wash out the copper from the feathers, and the most severe chemical treatment short of actual destruction of the pigment itself does not remove it from the prepared and pure turacine, it is evident that this metal, copper, is an integral constituent of the substance under investigation. To give an idea of the intimate union between the copper and the other constituent elements of the colouring matter. I may mention that I once dissolved some turacine in oil of vitriol, diluted with half its bulk of water, precipitated the turacine again by sodic acetate, and found that there had been no loss of copper by solution in the strong acid. There is no possibility of any mistake having occurred as to the copper present in the red parts of the feathers of the Toura-

coes. It cannot have been introduced in any preservative solution, for it would then be found in the black parts of the web as well as in the red; it cannot be an artificial dye, for birds bred in captivity acquire the cupreous pigment naturally; it cannot be an accidental and unnecessary constituent of the red colouring matter, for not only is it impossible to remove it from the colour, but the proportion of copper present in the turacine obtained from different individual birds remains constant. The results of very careful determinations of the amount of copper in two different specimens of pure turacine were quite accordant, one analysis affording me 7.20 parts of black oxide of copper in 100 parts of turacine; the other yielding 7.38 parts. These proportions correspond respectively to 5.75 and 5.89 parts of metallic copper in 100 of the red pigment. I am inclined to think that this amount is really rather below the true per-centage. It is most abundant at the pairing season, and the bridal plumage of a Turacus albocristatus generally yields about three grains of the pigment.

"Turacine is the first animal or vegetable pigment containing copper as an essential element, which has been hitherto isolated; yet traces of copper have been repeatedly found both in animals and plants. Many chemists have detected minute traces of copper even in human blood, and twenty years ago Deschamps arrived at the conclusion that it is normally contained in the blood of man and animals, being in the first place taken up by plants from the soil. Odling and Dupré have indeed subsequently detected copper in flour, straw, hay, meat, eggs, cheese, and other articles of food. It is not, therefore, difficult to perceive whence the Touracoes, or plantain-eaters, derive the copper which their red feathers contain. The vegetable food on which they subsist doubtless contains this metal, and I have indeed succeeded in obtaining indications of copper from the ash of three fruits of a plantain, the common Musa sapientum, purchased of a London fruiterer."

The Touracoes have been divided by modern naturalists into numerous small genera; but Mr. Sclater thinks "it is

more natural, as well as more easily intelligible, to consider them as forming only three genera, which may be distinguished among themselves by very simple characters. These are, Musophaga, Corythaix, and Schizorhis. In the Musophaga, or Plantain-eaters, the culmen of the bill, at the base, is produced into a frontal shield, which covers the forehead, and the nostrils are oval. In Corythaix, or the True Touracoes, there is no frontal shield, and the nostrils are oval. In Schizorhis, or the False Touracoes, there is likewise no frontal shield, but the nostrils, as indicated by the name, are linear in shape."

Only two species of the genus Musophaga, or Plantaineaters, are known to naturalists, and one of these, Ross's Plantaineater, is so scarce that but a single specimen of it has ever been met with. The other, commonly called the Violet Plantaineater, is the most brilliantly-coloured bird of the group, and, indeed, of all the African birds. Its plumage is of a rich, dark purple, with crimson wings and head, while the bill and head-shield are yellow and red. This magnificent bird is not unfrequently brought alive to Europe, and forms a splendid ornament to our aviaries; but it does not, however, thrive well in captivity.

The genus Corythaix contains ten or twelve species, some of which have the nostrils more or less concealed by the projecting frontal plumes, and bear a peculiar erectile compressed crest, something like the short-cut mane of a hobbyhorse, which is often edged with a different colour at its upper margin. In most of them the crest is green, but in one peculiar species, of which we give an illustration, the crest is pure white, without any border. This rare and remarkable bird, the White-crested Touraco (Corythaix leucolopha), was discovered by the well-known African traveller, Theodor von Heuglin, in 1852, during his sojourn in the country of the Bari negroes, on the Upper Nile, between the fourth and fifth degrees of north latitude. Our plate is copied from a coloured figure drawn by the discoverer of the species.

The two West African species of this genus which are

most commonly brought to Europe alive, are Buffon's Touraco (C. Buffoni), and the Senegal Touraco (C. persa), of both of which living specimens may usually be seen in the large aviary in the Zoological Society's gardens, situated immediately to the right of the principal entrance.

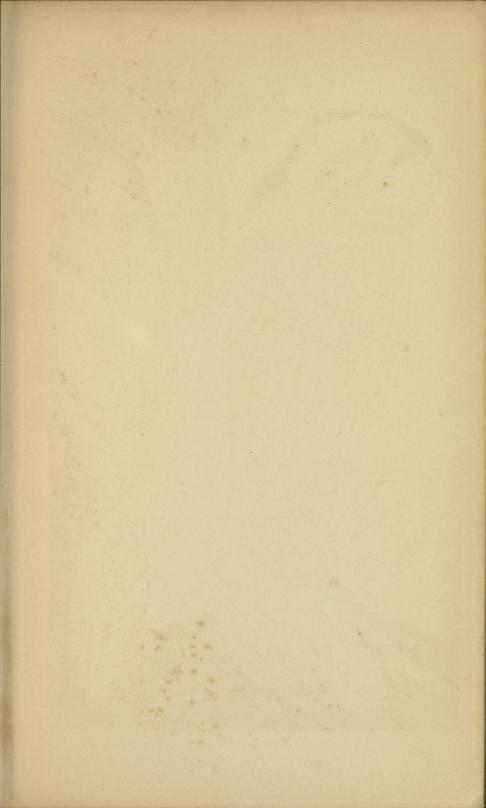
Another species of the same genus, the Giant Touraco (C. gigantea), stands alone, being not only remarkable for its large size, but also differs in several points of structure from the other species. The peculiar crimson colour of the primary and secondary wing-feathers which is found in every other species of Corythaix, as well as in Musophaga, and supplies the turacine pigment, is not present, all the wing-feathers being of a uniform green, like the back. This fine and powerful bird inhabits the tropical forests of Western Africa.

The genus Schizorhis, or False Touracoes, have the nostrils linear and naked, and their wing-feathers are without

the peculiar colour that produces turacine.

"As regards habits," says Mr. P. L. Sclater, "the Touracoes are a strictly arboreal group of birds, passing the greater part of their lives upon forest trees, and seldom, if ever, descending to the ground. They are mostly of brilliant plumage, and of moderate size—about that of a domestic pigeon, and are particularly active and lively in their movements. Those in the Zoological Society's aviaries never seem to be still for a minute, being constantly engaged in flitting from one perch to another, and alternately elevating and depressing their elegant crests. Their food, in a state of nature, is mostly, if not entirely, fruit, the name of the principal genus, Musophaga, being formed from their wellknown partiality for the fruit of the plantain (Musa). We have as yet no very authentic details as to their mode of nidification; but it is usually stated that they build in hollow trees, and lay white eggs. The sexes, as far as is known, in all species of this group are coloured alike, or very nearly so.

"The Touracoes are found only in Africa, and, in fact form one of the most characteristic groups of what is now generally denominated the 'Æthiopian Region,' being absolutely unknown in other parts of the world's surface. Just as a geologist may often recognize a stratum by one peculiar fossil, so a naturalist, upon inspecting a collection of birds in which a single skin of a Touraco occurred, would say with certainty, 'This collection was formed in some part of Africa.' Several other groups of birds have exactly the same distribution—such as the Colies (Coliidæ), the Oxpeckers (Buphaga), and the Guinea-fowls (Numididæ), and serve to differentiate the Æthiopian from the Indian Region."



EW ZEALAND OWL-PARROT.

THE OWL-PARROT, OR KAKAPO.

(Strigops Habroptilus.)

A SPECIMEN of this very interesting bird, the first of its species that ever reached England alive, was recently forwarded to Mr. G. S. Sale, by his friend Mr. Abbot, Registrar of the Supreme Court at Hokitika, New Zealand, having been purchased by him from the West Coast natives. Every previous attempt to bring one alive to this country had failed, although many had been forwarded from New Zealand, of which country the bird is a native, particularly one from Sir George Grey, when Governor of that colony, which unfortunately died on the voyage. Mr. Sale deposited it for a time at the Zoological Gardens, where the bird persisting in its nocturnal habits, was always hidden in its box in a dark corner during daylight. It was afterwards removed to his residence.

The existence of the Kakapo appears to have been first made known to European explorers through seeing its green feathers, which were worn by the natives of New Zealand, who formerly set great value on these birds, cutting off their heads, which they strung by the nostrils and wore in their ears on feast days. The bird itself long remained unknown to Europeans, its habit of hiding by day in holes in the ground, and its wonderful plumage so closely resembling the aspect of its haunts, rendering it almost impossible of discovery; and the first skin did not reach Europe till the year 1845.

The great peculiarity of this species is that it combines the special characteristics of the owl with those of the parrot, and although the latter predominate, the former are quite apparent. The Owl-Parrot has the facial disc, which is the chief characteristic of the owl tribe, but not to the same extent. The feathers of the face are somewhat different in colour and appearance to those on the rest of the body, being rather elongated and hairy, especially those close to the beak, their colour being a light yellowish-brown, which becomes darker on the ear-coverts. There is a pale yellowish stripe over each eye, and this joins an indistinct band of the same colour which edges the disc. The eyes do not appear to be larger in proportion than in other parrots, which is contrary to what might be expected from their owl-like characteristics. They are black, but, as is usual in such cases, the irides are probably of a very dark brown. The plumage combines the rich green which predominates in the parrot tribe, with blackish-brown mottlings and transverse bars, and dashes of pale yellowish buff peculiar to almost all owls.

Speaking of its plumage, our artist, Mr. Wood, says: "I could not help being struck by the circumstance which, no doubt, is observable when the bird is in its native haunts, that these colours are absolutely the same as those which immediately surround the bird; the green colour being that of the grass, the yellow dashes the same as the oats and other grain on which the bird feeds, and the blackishbrown bars imitating the soft mould which, with grass, Mr. Misselbrook, the head keeper, with his usual good judgment, had caused to be placed for his charge to run upon; this he did with great glee, and most frequently and continuously in the attitude I have attempted to portray in the figure in the background of the coloured plate, the neck being so twisted that the position of the head is inverted, the point of the bill pointing upwards, and the top of the head being towards the ground. In this grotesque attitude. and evidently for the fun of the thing, the bird will run briskly round and round for five or ten minutes, to the great discomfiture of his portrait-painter, whose desire was to represent him in an attitude worthy of the dignity of so distinguished a member of his tribe. Several other species of parrot, and most of the cockatoos, are fond of twisting their necks, apparently to the utmost extent of twistability of that organ, and the cockatoos, especially from the strong sense of humour which they constantly display, are not unworthy to be considered as the clowns amongst birds. This humorous disposition does not seem to be discoverable in any of 'our feathered friends' but those of the parrot tribe, and perhaps this fact will be admitted as proof that these birds are more intelligent than those of any other family."

The Owl-Parrot is rather smaller than the raven, its extreme length being two feet four inches, of which the tail measures nine inches. Mr. A. D. Bartlett, the Superintendent of the Zoological Gardens, confirms the statement that the Owl-Parrot lives on fruit and vegetables, and states that it would not eat the meat which he offered, and that it would not catch a mouse. It is said to have a voracious appetite. Those who have tasted its flesh say that it is tender and of exquisite flavour, and that it has large quantities of firm and white fat under the skin. It is often kept in confinement in its native land.

Mr. Sale had this bird in his possession for several months before depositing it at the Zoological Gardens, and during that time carefully watched its habits. "With regard to the particular bird in my possession," he says, "I observe that it rarely makes any noise by day. But about dusk it usually begins to screech, its object being apparently to attract attention, for, if let loose from its cage and allowed to have its usual play, it ceases to make any noise. It also makes a grunting noise when eating, especially if pleased, and I have myself attracted it to me by imitating the same sound. It also screeches sometimes when handled, not apparently from anger, but more from timidity. The sound of the bird is not a shrill scream, but a muffled screech, more like a mingled grunt and screech.

"Sir G. Grey exactly hit the chief characteristics of the Kakapo, when he spoke of its affectionate and playful disposition. During the whole time that this bird has been in my possession, it has never shown the slightest sign of illtemper, but has invariably been good-humoured and eager to receive any attention. Its playfulness is remarkable. It will run from a corner of the room, seize my hand with claws and beak, and tumble over and over with it exactly like a kitten, and then rush back to be invited to a fresh attack. Its play becomes sometimes a little severe; but the slightest check makes it more gentle. It has also, apparently, a strong sense of humour. I have sometimes amused myself by placing a dog or cat close to its cage, and it has danced backwards and forwards with outstretched wings, evidently with the intention of shamming anger, and has testified its glee at the success of the manœuvre by the most absurd and grotesque attitudes. One trick especially it has, which it almost invariably uses when pleased, and that is, to march about with its head twisted round, and its beak in the airwishing, I suppose, to see how things look wrong way up, or perhaps it wishes to fancy itself in New Zealand again.

"The highest compliment it can pay you is to nestle down on your hand, ruffle out its feathers, and lower its wings, flapping them alternately, and shaking its head from side to side; when it does this it is in a superlative state of enjoyment. I do not think it is quite correct to say that it has dirty habits; certainly it is not worse in this respect

than an ordinary parrot.

"I am surprised to find that during the time it was in the Zoological Gardens, it very rarely showed itself in the daytime. My experience has been the reverse of this. It has generally been lively enough during the greater part of the day, though not quite so violent and noisy as at night. I had this bird at Saltburn, in Yorkshire, during the summer, and at the bazaar held in aid of the district church, its playfulness never flagged during the whole day. This may partly have been due to excitement at seeing so many strange faces; but it also no doubt felt the excellence of the cause (recollect, Sir G. Grey testifies to its cleverness and intelligence), and exerted itself accordingly to help the Church Building Fund."

Sir George Grey has given the following interesting

account of this bird, which he had excellent opportunitie8 of observing while Governor of its native country, New Zealand:-

"The Strigops is called Kakapo, or Night Kaka, by the aborigines of New Zealand, from the nocturnal habits of the bird. During the day it remains hid in holes under the roots of trees or rocks, or very rarely perched on the boughs of trees with a very dense thick foliage. At these times it appears stupid from its profound sleep, and if disturbed or taken from its hole, immediately runs and tries to hide itself again, delighting, if practicable, to cover itself in a heap of soft dry grass; about sunset it becomes lively, animated, and playful, issues forth from its retreat, and feeds on grass, weeds, vegetables, fruits, seeds, and roots. When eating grass it grazes rather than feeds, nibbling the grass in the manner of a rabbit or wombat. It sometimes climbs trees, but generally remains upon the ground, and only uses its short wings for the purpose of aiding its progress when running, balancing itself when on a tree, or in making a short descent, half jump, half flight, from an upper to a lower bough. When feeding, if pleased with its food, it makes a continued grunting noise; it is a greedy bird and choice in its food, showing an evident relish for anything of which it is fond. It cries repeatedly during the night, with a noise not very unlike that of the kaka (the nestor), but not so loud.

"The Kakapo is a very clever and intelligent bird, in fact, singularly so; contracts a strong affection for those who are kind to it; shows its attachment by climbing about and rubbing itself against its friend, and is eminently a social and playful bird; indeed, were it not for its dirty habits, it makes a far better pet than any other bird with which I am acquainted, for its manner of showing its attachment by playfulness and fondling is more like that of a dog than a bird.

"It builds in holes under trees and rocks, and lays two or three white eggs about the size of a pullet's, in the month of February, and the young birds are found in March.

"At present (1854) the bird is known to exist only in the Middle Island of New Zealand, and the west coast between Chalky Harbour and Jackson's Bay, and in the Northern Island about the sources of the Whangarie, and in part of the Taufa countries.

"It was within the recollection of the old people abundant in every part of New Zealand, and they say it has been exterminated by the cats introduced by the Europeans, which are now found wild and in great numbers in every part of the country. They say also that the large rat introduced from Europe has done its part in the work of destruction.

"The natives assert that when the breeding season is over, the Kakapo lives in societies of five or six in the same hole, and they say it is a provident bird, and lays up in the fine season a store of fern root for the bad weather. I have had five or six of the birds in captivity, but never succeeded in keeping them alive for more than eighteen months or two years. The last I had I sent home as a present to the Zoological Society, but it died off Cape Horn."

The following valuable particulars of the Kakapo in its wild state were communicated to the Zoological Society by Mr. David Lyall:—

"Although the Kakapo is said to be still found occasionally on some parts of the high mountains in the interior of the North Island of New Zealand, the only place where we met with it, during our circumnavigation and exploration of the coast of the island in H.M.S. 'Acheron,' was at the south-west end of the island. There, in the deep sounds which intersect that part of the island, it is still found in considerable numbers, inhabiting the dry spurs of hills or flats near the banks of rivers, where the trees are high, and the forest comparatively free from fern or underwood.

"The first place where it was obtained was on a hill nearly four thousand feet above the level of the sea. It was also found living in communities on flats near the mouths of rivers close to the sea. In these places its tracks were to be seen resembling footpaths made by man, and leading us at first to imagine that there must be natives in the neighbourhood. The tracks are about a foot wide, regularly pressed down to the edges, which are two or three inches deep amongst the moss, and cross each other usually at right

angles.

"The Kakapo lives in holes under the roots of trees, and is also occasionally found under shelving rocks. The roots of many New Zealand trees growing partly above ground, holes are common under them; but where the Kakapo is found many of the holes appeared to have been enlarged, although no earth was ever found thrown out near them. There were frequently two openings to these holes, and occasionally, though rarely, the trees over them were hollow for some distance up.

"The only occasion on which the Kakapo was seen to fly was, when it got up one of these hollow trees and was driven to an exit higher up. The flight was very short, the wing scarcely being moved; and the bird alighted on a tree at a lower level than the place from whence it had come, but soon got higher up by climbing, using its tail to assist it.

"Except when driven from its holes, the Kakapo is never seen during the day, and it was only by the assistance of

dogs that we were enabled to find it.

"Before dogs became common, and when the bird was plentiful in inhabited parts of the island, the natives were in the habit of catching it at night, using torches to confuse it. It offers a formidable resistance to a dog, and sometimes inflicts severe wounds with its powerful claws and beak. At a very recent period it was common all over the west coast of the Middle Island, but there is now a race of wild dogs said to have overrun all the northern part of this shore, and to have almost extirpated the Kakapoes wherever they have reached. Their range is said to be at present confined by a river or some such physical obstruction, and it is to be feared that if they once succeed in gaining the stronghold of the Kakapo (the south-west end of the island) the bird may soon become extinct.

"During the latter half of February and the first half of

March, while we were amongst the haunts of these birds, we found young ones in many of the holes, frequently only one, never more than two, in the same hole. In one case where there were two young ones, I found also an addled egg. There was usually, but not always, an old bird in the same hole with the young ones.

"They build no nest, but simply scrape a slight hollow amongst the dry dust formed of decayed wood. The young were of different ages, some being nearly fully fledged, and others covered only with down. The egg is white, and about the size of a pigeon's.

"The cry of the Kakapo is a hoarse croak, varied occasionally by a discordant shriek when irritated or hungry. The Maories say that during winter they assemble together in large numbers in caves, and at the times of meeting, and, again before dispersing to their summer haunts, that the

noise they make is perfectly deafening.

"A good many young ones were brought on board the ship alive. Most of them died a few days afterwards, probably from want of sufficient care; some died after being kept a month or two, and the legs of others became deformed after they had been a few weeks in captivity. The cause of deformity was supposed to be the want of proper food and too close confinement. They were fed chiefly on soaked bread, oatmeal and water, and boiled potatoes. When let loose in a garden they would eat lettuces, cabbages, and grass, and would taste almost every green leaf that they came across. One, which I brought within six hundred miles of England (when it was accidentally killed), whilst at Sydney, ate eagerly of the leaves of a Banksia and several species of Eucalyptus, as well as grass, appearing to prefer them all to its usual diet of bread and water. It was also very fond of nuts and almonds, and during the latter part of the homeward voyage lived almost entirely on Brazilian ground-nuts.

"On several occasions the bird took sullen fits, during which it would eat nothing for two or three days at a time, screaming and defending itself with its beak when any one attempted to touch it. It was at all times of an uncertain temper, sometimes biting severely when such a thing was least expected. It appeared to be always in the best humour when first taken out of its box in the morning, hooking on eagerly with its upper mandible to the finger held down to lift it out. As soon as it was placed on the deck it would attack the first object which attracted its attention—sometimes the leg of my trousers, sometimes a slipper or a boot. Of the latter it was particularly fond; it would nestle down upon it, flapping its wings, and showing every symptom of pleasure. It would then get up, rub against it with its sides, and roll upon it on its back, striking out with its feet whilst in this position.

"One of these birds sent on shore by Captain Stokes to the care of Major Murray of the 65th Regiment at Wellington, was allowed to run about his garden, where it was fond of the society of the children, following them like a dog wherever they went.

"Nearly all the adult Kakapoes which I skinned were exceedingly fat, having a thick layer of oily fat or blubber on the breast which it was very difficult to separate from the skin. Their stomachs contained a pale green, sometimes almost white, homogeneous mass without any trace of fibre in it.

"There can be little doubt but that their food consists partly of roots (their beaks are usually more or less covered with indurated mud), and partly of the leaves and tender shoots of various plants. At one place where the birds were numerous we observed that the young shoots of a leguminous shrub growing by the banks of a river were all nipped off, and this was said by our pilot, who had frequented these places for many years in a whaling-vessel, to be the work of the Kakapo."

In connection with the Ornithology of New Zealand, it may interest our readers to learn that in 1839, Professor Owen received from that country a specimen of the femur of a gigantic bird, allied to the ostrich and other struthious

(running) birds now in existence, to which he gave the name of *Dinornis*; and soon after a large collection of the bones of other extinct birds, made by Mr. Walter Mantell, of Wellington, son of the late Dr. Gideon Mantell. This collection not only contained the bones of the *Dinornis*, confirming all the anticipations which had been formed by Professor Owen of this gigantic bird, but also the remains of several other species of *Dinornis*, and other genera. The character of some of these remains, and their having been found in fire-heaps in conjunction with human bones, and allusions in the traditions and songs of the natives, lead to the undoubted conclusion that within the historic period the *Dinornis*, under the name of Moa, was known to the Maoris, the native inhabitants of New Zealand.

The history of the New Zealand birds is also one of special interest in connection with a group of birds, some of which also, as the *Dodo* and *Solitaire*, have existed within the historic period, but are now no longer to be found, and which had their principal seat of existence in the Mauritius.

THE END.









